

NAVAL WAR COLLEGE REVIEW

Autumn 2009

Volume 62, Number 4



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Cover

USS Augusta in Narragansett Bay, 2 May 1941, a watercolor painting by the marine artist Ian Marshall. The scene shows the heavy cruiser USS Augusta (CA 31) on the day that Admiral Ernest J. King broke his four-star flag in Augusta as Commander in Chief, U.S. Atlantic Fleet. The ship is moored to a buoy on the Jamestown side of the bay (that is, near Conanicut Island, visible to the left), Admiral King's preferred location; the Naval War College and a signal tower next to Pringle Hall are in the distant background (to the right), and two ship's boats are approaching—perhaps from the Newport, Rhode Island, fleet landing, or from other ships—to join three already riding to a boom. The cruiser was to be in Newport nearly continuously until January 1942, when King became Chief of Naval Operations. The tower and the tall antennas visible beyond the College complex were removed in the 1960s and '70s.

*The painting was commissioned by the Naval War College Museum, using funds provided by the Naval War College Foundation, to record a local scene not otherwise visually recorded in the Museum's collections. The painting, delivered on 29 September 2008, hung in the Museum's *Predators and Guard Dogs: An Exhibit of the Works of Ian Marshall* from 12 February to 30 June 2009 and then joined the permanent collection, in a new display case installed through the generosity of Robert Alvine's gift to the Foundation and Museum.*

Born in Fife, Scotland, and originally trained as an architect, Ian Marshall lives today on Mount Desert Island in Maine. He is the author of five books illustrated by his meticulously accurate historical ship paintings, and his work hangs in the permanent collections of many museums in the United States and Europe.

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FROM THE EDITORS

At this writing, the outcome and repercussions of the current crisis of regime in Iran are entirely uncertain. The disputed election of 12 June has clearly set in motion events that threaten to erode the fundamental legitimacy of the Islamic Republic, but the regime has so far demonstrated its determination to ride out the crisis whatever the human or political costs. From the vantage point of Washington, it is too early to conclude that the security calculus in the Middle East has changed in any significant way as a result of all this, in spite of some hopeful signs. Indeed, it would be prudent to contemplate the possibility that an Iranian regime of diminished legitimacy will be tempted to recoup its prestige internally and in the region by a course of military adventurism and confrontation with the United States. In this perspective, Daniel Gouré and Rebecca Grant, in their “U.S. Naval Options for Influencing Iran,” provide a useful and timely analysis of the American naval presence in or near the Persian Gulf and the ways it could be used or altered to “shape” the strategic behavior of the Iranian regime through various phases of a hypothetical conflict.

This issue features three articles under our familiar “Asia Rising” rubric. Evan S. Medeiros analyzes the results of a recent study of the perceptions and attitudes of friends and allies of the United States in East Asia with respect to the rising power and regional profile of the People’s Republic of China. His conclusion is that on the whole the United States has not been fundamentally disadvantaged as a result of this development, contrary to a common view of the matter. Two articles then address from complementary perspectives an issue of critical importance for the United States Navy. In “Using the Land to Control the Sea? Chinese Analysts Consider the Antiship Ballistic Missile,” Andrew S. Erickson and David D. Yang provide a detailed survey and analysis of the Chinese open-source military and technical literature concerning antiship ballistic missiles (ASBMs) and the manner in which they might be employed against U.S. carrier battle groups in the western Pacific in the event of a conflict, while Eric Hagt and Matthew Durnin review Chinese thinking concerning the intelligence, surveillance, and reconnaissance architecture supporting a putative ASBM capability, again on the basis of open-source Chinese materials. Both papers were prepared for a conference on Chinese aerospace development sponsored by the China

Maritime Studies Institute of the Naval War College and held in Newport in December 2008.

Naval leadership has always been an important dimension of education, both formal and informal, at the Naval War College. Over the last several years, it has received renewed and intensive attention through the work of the College of Operational and Strategic Leadership and the Stockdale Group student research effort associated with it. In support of this ongoing work, Professors John Hattendorf and Bruce Elleman have edited a volume of essays on famous American admirals, *Nineteen Gun Salute: Case Studies of Operational, Strategic, and Diplomatic Naval Leadership in the 20th and Early 21st Centuries*, due to be jointly published in the fall by the Naval War College Press and the U.S. Government Printing Office. Wayne P. Hughes's insightful essay on the leadership of Admiral Raymond Spruance during the war in the Pacific provides a sampling of the contents of this outstanding collection. Spruance, the victor of the battle of Midway, is also a past president of the Naval War College.

The battle of Midway (4–7 June 1942) is the point of reference for Jeremy Black's account of the strategic opportunities afforded the Axis powers by the weakness of the British position in India and the Indian Ocean in the early years of World War II. The failure of the Japanese to take advantage of these opportunities (in particular by occupying Ceylon) in favor of confronting the American navy in the Central Pacific, Black argues, is symptomatic of the larger failure in coalition warfare that contributed so centrally to the Axis defeat.

On 7–8 April 2009, the International Law Department (ILD) of the Center for Naval Warfare Studies held a workshop on countering piracy with some fifty legal and policy experts from around the world, to revisit conventional thinking on this pressing topic and explore new approaches. The final report of the workshop, prepared by Commander James Kraska of the ILD faculty, is reproduced (with some modifications) here. The high point of this event occurred when several participants joined a U.S. government interagency conference call to discuss how to deal with the hostage standoff involving the M/V *Maersk Alabama*.

WINNERS OF OUR ANNUAL ARTICLE PRIZES

The President of the Naval War College has awarded prizes to the winners of the annual Hugh G. Nott and Edward S. Miller competitions for articles appearing in the *Naval War College Review*.

The Nott Prize, established in the early 1980s, is given to the authors of the best articles (less those considered for the Miller Prize) in the *Review* in the preceding publishing year. Cash awards are funded through the generosity of the Naval War College Foundation.

- First place: Gabriel B. Collins and William S. Murray, “No Oil for the Lamps of China?” Spring 2008 (\$1,000, shared between coauthors)
- Second place: James R. Holmes and Toshi Yoshihara, “China and the United States in the Indian Ocean: An Emerging Strategic Triangle?” Summer 2008 (\$650, shared between coauthors)
- Third place: William S. Murray, “Revisiting Taiwan’s Defense Strategy,” Summer 2008 (\$350).

The Miller Prize was founded in 1992 by the historian Edward S. Miller for the author of the best historical article appearing the *Review* in the same period. This year’s winner is Robert J. Hanyok, for “‘Catching the Fox Unaware’: Japanese Radio Denial and Deception and the Attack on Pearl Harbor” (Autumn 2008, \$500). In addition, “Fortuitous Endeavor: Intelligence and Deception in Operation TORCH” (also in Autumn 2008), by John Patch, received honorable mention.

FORTHCOMING FROM THE NAVAL WAR COLLEGE PRESS

The sixteenth in our Historical Monograph series, Dr. Evelyn Cherpak’s *Three Splendid Little Wars: The Diary of Joseph K. Taussig, 1898–1901*, is now in press. This diary, Professor John B. Hattendorf writes in his foreword, is “a valuable glimpse of the initial stage of a naval officer’s professional military education just a little over a century ago.” It will be sold online by the U.S. Government Bookstore, <http://bookstore.gpo.gov/>.

The next (number 34) in our Newport Papers monograph series, *Somalia . . . From the Sea*, by Gary J. Ohls, also in press, has been posted on our website. Dr. Ohls, of the Naval Postgraduate School, has written an account of the repeated U.S. attempts in the 1990s, in the framework of newly developed expeditionary doctrine, to rescue Somalia from the chaos and starvation that had engulfed it. These attempts were, as Dr. Hattendorf notes, to leave “a bitter impression that influenced American foreign policy and military thinking for some time thereafter.”



Rear Admiral James “Phil” Wisecup became the fifty-second President of the U.S. Naval War College on 6 November 2008. He most recently served as Commander, Carrier Strike Group 7 (Ronald Reagan Strike Group), returning from deployment in October 2008.

A 1977 graduate of the U.S. Naval Academy, Rear Admiral Wisecup earned his master’s degree in international relations from the University of Southern California, graduated from the Naval War College in 1998, and also earned a degree from the University of Strasbourg, France, as an Olmsted Scholar, in 1982.

At sea, he served as executive officer of USS Valley Forge (CG 50) during Operation DESERT STORM. As Commanding Officer, USS Callaghan (DDG 994), he was awarded the Vice Admiral James Stockdale Award for Inspirational Leadership. He served as Commander, Destroyer Squadron 21 during Operation ENDURING FREEDOM after 9/11.

Ashore, he was assigned to NATO Headquarters in Brussels, Belgium; served as Force Planner and Ship Scheduler for Commander, U.S. Naval Surface Forces, Pacific; and served as action officer for Navy Headquarters Plans/Policy Staff. He served as a fellow on the Chief of Naval Operations Strategic Studies Group; as Director, White House Situation Room; and as Commander, U.S. Naval Forces Korea.

Rear Admiral Wisecup’s awards include the Defense Superior Service Medal, Legion of Merit, Bronze Star, and various unit, service, and campaign awards.

PRESIDENT'S FORUM



Taking Stock

AS I WATCH THE MORNING SUN come up over Narragansett Bay and the Claiborne Pell Bridge, let me share some thoughts with our readers, the Navy leadership, and, of course, our students. We at the College are preparing to embark on our 125th year here in Newport.

With every passing day, I am more and more convinced of the value of the education that we provide for our naval officers, as well as for the international officers, for officers of our sister services, and for the agencies of government. Contrary to recent discussions in blogs and the press, I also believe that we are offering the best courses on strategy anywhere. Our students will not be outclassed by those educated at major research universities. In fact, our student body is made up of serving professionals, many right off the front lines of current conflicts. This is one of the factors that make us truly unique. The students' experience enriches the curriculum and represents a vital component of our educational enterprise.

Admiral Turner's words from his convocation speech still ring true almost 40 years later: "Another sample of the ineffectiveness of our military educational system is our increasing reliance on civilians and on 'think tanks' to do our thinking for us. Do not misunderstand. These people have done outstanding work for us. We very much need their help and stimulation into the future. We must, however, produce military men who are a match for the best of the civilian strategists or we will abdicate control of our profession."

I recently read a criticism of our military today that we are not taking more "institutional risk"—with the implied remedy of closing the war colleges, considered by some as "second rate"—to put more effort into today's fight. It is my recollection that George C. Marshall once said that closing Leavenworth was one

of his biggest mistakes during the Second World War. What some would call “presentism,” or thinking that the way the world is today is the way it will always be, is a very shortsighted view. The corollary would be to ask what the “return on investment” on this education is. We, after all, are called to serve as good stewards of the taxpayers’ dollars, and we are accountable for what we’re doing in Newport. We absolutely must carefully husband the scarce resources entrusted to us and plan effectively. The importance of constantly assessing return on investment was underlined to me on a recent visit to a well known company’s executive education center, which is also used by the firm’s chief executives as a place they meet to discuss big changes. When I asked the question about return on investment, I got a quizzical look and the answer “No one has ever asked me that question.” I was floored.

Education is not training. It is about conveying bodies of knowledge, developing lifelong habits of thought and learning, critical thinking skills, and the ability to solve highly ambiguous and formless problems. In our case, the student body brings in tremendous experience. It’s like flint to the steel of our distinguished faculty: you need both to make fire, and that’s the deal. I recently approved a plan to place a Naval War College “alumni hall of fame” in Spruance Hall. What really struck me was the number of Medal of Honor recipients on that list of alumni from the Second World War.¹ It is a long list and a familiar one to naval officers who know the Navy’s history. Additionally, we expect to add the hundreds of international officers to this list, graduates from Newport, who have risen to positions of high responsibility in their governments—that is quite an impressive list too.

Of course, today there are other options in the “path to jointness”—National Defense University, as well as the other fine service institutions at Leavenworth, Quantico, Maxwell, and Carlisle. As we pursue a more joint force, it’s only normal, then, that the number of senior leaders coming exclusively to Newport becomes smaller. That said, the current military commanders in Iraq, Afghanistan, and now in Europe, as well as our ambassador in Iraq, are today all Naval War College graduates.

So what?

As Sun Tzu puts it in the opening lines of *The Art of War*: “War is a matter of vital importance to the State; the province of life and death; the road to survival or ruin. It is mandatory that it be thoroughly studied.” Churchill’s view was that skilled planners must have a thorough education on strategy, and that requires time at a war college. Otherwise, as he stated of the Royal Navy’s leadership during the First World War, the service will have only captains of ships rather than captains of war.²

So, in the aggregate, the Naval War College is working to ensure that we naval officers do not abdicate control of our profession, while getting our arms around what's going on in the world and helping the Chief of Naval Operations determine what the Navy should look like in the future. It's about anticipating—both the international environment and what we should be doing about it. We have the facilities, the faculty, the analysts, the seasoned professionals in the student body, and the concepts to game what we anticipate—as we have done in Newport for over a hundred years. A recent YouTube video makes the statement “We are living in exponential times.”³ There is much truth in that. To quote Ernest, Lord Rutherford, in the face of complex and quickly changing world events and decreasing budgets, “We don't have money, so we have to think.”⁴ My bet is on Naval War College graduates.



JAMES P. WISECUP

*Rear Admiral, U.S. Navy
President, Naval War College*

NOTES

1. Eighty-nine of ninety flag officers who served in the Second World War were graduates of this institution, and some, like Raymond A. Spruance and Richmond K. Turner, also served on the faculty.
2. Winston S. Churchill, *The World Crisis, 1911–1914* (London: Butterworth, 1923), p. 93.
3. Karl Fisch, Scott McLeod, and Jeff Brenman, *YouTube: Did You Know?* 3.0, 2008.
4. Ernest, Lord Rutherford, of New Zealand, a famous nuclear scientist and a Nobel Prize winner in chemistry.

Dr. Gouré is a vice president with the Lexington Institute, a nonprofit public-policy research organization headquartered in Arlington, Virginia. He is involved in a wide range of issues as part of the institute's national security program. Dr. Rebecca Grant is a senior fellow of the Lexington Institute. Her research focuses on airpower, joint operations, cyberspace, and other issues within the institute's national security program.

U.S. NAVAL OPTIONS FOR INFLUENCING IRAN

Daniel Gouré and Rebecca Grant

This article is intended to explore the range of options the U.S. Navy can provide to policy makers in developing a strategic approach to Iran. The Barack Obama administration has taken power just as a delicate change is beginning in the region. The American land, air, and naval presence in the Persian Gulf will diminish as forces return from Iraq. Simultaneously, the Obama administration will be trying to elicit from Iran an agreement not to develop a nuclear weapons program. At the same time, the new administration is committed to restructuring significantly U.S. armed forces. Changes in the naval presence in the region need to be considered not only with respect to domestic constituencies but also in light of the nation's security interests in the region.

The subsequent analysis focuses on the range of policy-relevant options the U.S. Navy can provide, short of war, that could help shape Iran's behavior. "Shaping" as a strategy can be defined as the performance of a set of continuous, long-term, integrated actions—with a broad spectrum of governmental, nongovernmental, and international partners—that seeks to influence the behavior of target nations and thereby maintain or enhance stability, prevent or mitigate crises, and enable other operations when crises occur. Actions short of war designed to influence the behavior of another nation fall under the rubric of shaping operations. With the end of the Cold War, shaping operations became a more important part of the Navy's array of activities.

The Navy's 2007 *Cooperative Strategy for 21st Century Seapower* identified shaping as one of the critical element of naval operations.

This strategy reaffirms the use of seapower to influence actions and activities at sea and ashore. The expeditionary character and versatility of maritime forces provide

the United States the asymmetric advantage of enlarging or contracting its military footprint in areas where access is denied or limited. Permanent or prolonged basing of our military forces overseas often has unintended economic, social or political repercussions. The sea is a vast maneuver space, where the presence of maritime forces can be adjusted as conditions dictate to enable flexible approaches to escalation, de-escalation and deterrence of conflicts.¹

Navy leaders have never been shy about extolling the ability of maritime forces to shape behavior and influence events. “The Navy’s role in global influence and deterrence will grow significantly in the future,” Admiral John Nathman, former Commander, Fleet Forces Command, has said. “You can go up to 12 nautical miles [to a country’s shoreline] without asking permission. You come with no footprint. And you deliver a message that can be broad, subtle, persistent, credible or powerful. The Navy can do that.”²

Demand for Navy shaping operations has risen steadily over the past several years. All joint forces are engaged in shaping actions, which range from theater security cooperation and shaping to more elaborate options to deter and seize the initiative.

When thinking about deterring Iran, one thinks quickly of Navy options. In fact, there is both a valuable historical legacy and an important niche role for the Navy in operations to counter Iran at various levels of engagement. The same warships on scheduled deployment rotation can shift from presence to deterrence to the countering of aggression. Day in and day out, Navy forces help set the limits of Iranian military action in the Gulf.

Few question the idea that unique Navy capabilities to shape and deter have special strategic significance. Yet there is little awareness in the broader policy community of the impact that naval presence can have on the situation in the Persian Gulf over the longer term and during crises. Nor has it been made clear to decision makers that Iran’s leadership is aware of our naval actions and factors the presence and operations of the U.S. Navy into its strategic calculations.

U.S. POLICY TOWARD IRAN

The United States has struggled to manage the dangers posed by the revolutionary regime in Tehran for nearly thirty years. Since the 1979 Iranian revolution, the central policy objective of the United States has been to change the behavior of the regime. It has sought to do so by a combination of means, including a larger military presence in the region, enhanced support for regional allies (including, for a time, Iran’s principal adversary, Saddam Hussein’s Iraq), economic leverage, targeted sanctions, and limited engagement.

The George W. Bush administration was very clear about its security issues with Iran:

The behavior of the Iranian regime poses as serious a set of challenges to the international community as any problem we face today. Iran's nuclear ambitions; its support for terrorism; and its efforts to undermine hopes for stability in Iraq and Afghanistan, including lethal backing for groups attacking American troops, are all deeply troubling. So are its destructive actions in Lebanon, its longstanding rejection of a two-state solution for Israelis and Palestinians, and the profoundly repugnant rhetoric of its leaders about Israel, the Holocaust, and so much else. Compounding these concerns is Iran's deteriorating record on human rights.³

The approach the Bush administration took, like that of its predecessors for the past thirty years, was largely focused on shaping Iranian behavior.

Our policy toward Iran is clear and focused. First and foremost, we have demonstrated to the Iranian regime that its provocative and destabilizing policies will entail painful costs for Iran, including financial hardship, diplomatic isolation, and long-term detriment to Iran's prestige and fundamental national interests. Secondly, and equally importantly, we are working to convince the regime that another, more constructive course is available to it.⁴

Even though only recently in office, the Obama administration has made it clear that Iran will be a principal focus of its foreign policy. The Obama administration appears to hold objectives with respect to Iran very similar to those of the Bush administration. Foremost on its list of objectives is to prevent Iran from acquiring a nuclear weapon. In a recent television interview President Obama said, "Iran is going to be one of our biggest challenges." He specifically mentioned that country's support for Lebanese Shia party Hizballah and its nuclear enrichment program.⁵

While current U.S. intelligence estimates assert that Iran currently does not have an active nuclear weapons program, they suggest that this situation could change rapidly. According to retired admiral Dennis Blair, "We assess Iran has the scientific, technical and industrial capacity eventually to produce nuclear weapons. In our judgment, only an Iranian political decision to abandon a nuclear weapons objective would plausibly keep Iran from eventually producing nuclear weapons—and such a decision is inherently reversible."⁶

Current American policy has three basic threads: more negotiations (including direct talks), tougher sanctions, and the threat of military action. The goal is to shape Iranian behavior so as to make a resort to direct military force unnecessary. In particular, this means encouraging Iran to enter into direct talks with the United States and its allies. Ultimately, it is hoped, the diplomatic process will see Iran moderate its revolutionary stance, forgo the development of nuclear weapons, and integrate itself into the community of nations. President Obama is seeking what he terms "a new beginning" with Iran, one that emphasizes diplomacy. At the same time, the administration has sought to reinforce the

international coalition against Iran's nuclear program. According to recent press reports, the new administration has sent a secret letter to the Russian government offering to halt development of a ballistic-missile interceptor system in Eastern Europe, provided that Russia assist in halting Iran's effort to build nuclear warheads and ballistic missiles.⁷ The president has said that no option, including the use of force, is off the table with respect to halting the Iranian nuclear program.

Supporting the policy threads is an important factor in the operation of U.S. military forces. American military forces can play a large role in shaping Iranian

The utility of naval forces comes from their ability to exert control through presence and to dominate but contain conflict.

behavior. Given their inherent flexibility, sovereign basing, and tremendous mobility, U.S. naval forces are particularly well suited to contributing to shaping activi-

ties. Equally important, the same forces engaged in shaping operations can rapidly shift into combat mode, providing high-value military resources to the theater commander.

Iran's long-standing foreign-policy goals are to preserve the Islamic regime, safeguard Iran's sovereignty, defend its nuclear ambitions, and expand its influence in the region and the Islamic world. Iranian leaders perceive that regional developments—including the removal of Saddam and the Taliban, challenges facing the United States in Iraq and Afghanistan, the increased influence of Hamas and Hizballah, and, until recently, higher oil revenues—have given Tehran more opportunities and freedom to pursue its objective of becoming a regional power. This perception has produced a more assertive Iranian foreign policy, in which Tehran has focused on expanding ties in Iraq, Afghanistan, and the Levant to influence and exploit more effectively regional political, economic, and security developments. Iran's pursuit of nuclear-weapon capability is another element in its more assertive foreign policy.⁸

In pursuing its policy objectives vis-à-vis Iran, Washington clearly prefers to rely on a shaping strategy over the direct use of military force. But such a strategy presupposes that Iran is amenable to being shaped. There are some who argue that the Iranian leadership is not susceptible to influence, whether by "carrots" or "sticks." This would mean that there is no hope of shaping Iranian behavior in general or, more specifically, of influencing Iran's decisions on matters of security and defense.

There, however, is no evidence to support this contention. According to one leading American authority,

Although the specifics of Iran's policies vary considerably, in almost all cases there has been a shift toward prudence. Particularly near Iran's own borders, the Islamic regime has tended to support the status quo with regard to territorial integrity and has shown a preference for working with governments over substate movements. Moreover, Iran has tried to contain unrest abroad and has tacitly supported repression by Turkey and Russia, even when this involved suppressing Muslims. Tehran has also curtailed ties to most Islamist movements, keeping its network intact but not pushing for the overthrow of governments.

Iran has also shown prudence in its military posture, including its quest for WMD [weapons of mass destruction]. Iran's military budgets have been modest, focused more on defense than on offense. Despite the geostrategic and other imperatives driving Iran to acquire WMD, it has done so in a quiet and deliberate manner, avoiding alarm and preventing the United States from developing a strong coalition to stop its acquisition.⁹

In fact, Iran has demonstrated a rather nuanced approach to dealing with its neighbors and with states involved in the region, including the United States. This suggests that the leadership in Tehran can be influenced and that a process of shaping its behavior through a mixture of carrots and sticks could be effective in moderating the regime's behavior.¹⁰

The challenge for the Obama administration will be to find the right kind of shaping strategy, one that provides signals that Iranian leaders will understand. As will be discussed below, the U.S. Navy provides a range of options, with varying degrees of visibility that can contribute to American efforts to shape Iranian behavior in peacetime or in crisis.

NAVAL OPTIONS FOR INFLUENCING IRAN

The U.S. Navy can be an enormously powerful instrument of policy. There is no question that in the event of conflict with Iran, the Navy could exert tremendous pressure through its ability to contest and counter Iranian military moves in the waters around the Strait of Hormuz. Equally important, it has many potential opportunities to influence Iran during peacetime and in a crisis. The utility of naval forces comes from their ability to exert control through Phase 0* presence and to dominate but contain conflict in Phase II actions. As joint doctrine makes clear, phases III and beyond require a joint approach. However, as case studies demonstrate, the Navy has a powerful role in options just short of major conflict. The ensuing discussion will examine naval options for influencing Iran short of

* U.S. joint doctrine envisages campaigns as having six phases: 0 (that is, zero), preconflict "Shape"; I, "Deter"; II, "Seize Initiative"; III, "Dominate"; IV, "Stabilize"; and V, "Enable Civil Authority." U.S. Defense Dept., *Joint Operations*, Joint Publication 3-0 (Washington, D.C.: 17 September 2006, rev. 13 February 2008), fig. IV-7.

those involving a deliberate conflict. Prospective options are grouped by joint-campaign “phase.” Under each phase, a number of prospective options are identified.

Shaping the Regional Environment (Phase 0)

Unlike the other services, the Navy has extensive direct experience with the Iranian military and the Revolutionary Guard. American and Iranian warships pass in close proximity on a regular basis. When operating in the enclosed environment of the Persian Gulf, it is necessary to interact with other parties using the same space, including potential adversaries. This is an important base on which to develop influence or shaping options. At the same time, all parties in the region are quite sensitive to changes in that presence. Changes in the number and types of naval vessels deployed inevitably send messages to friends and foes alike.

American diplomats view the deployment of naval forces as adding to the effectiveness of political actions. These forces provide for reassurance of allies, act as a warning to would-be aggressors, and serve as clear evidence of U.S. interest in and commitment to the region. One senior diplomat makes the point very succinctly: “We have stationed two carrier battle groups in the Gulf to reassure our friends in the Arab world that it remains an area of vital importance to us.”¹¹

Friends and allies of the United States in the Persian Gulf clearly perceive the presence of its naval forces as deterring potential aggressors. They are not above using that presence for their own purposes. “Do you think those U.S. warships are out there on vacation?” Saudi king Abdullah is said to have asked Iranian president Mahmoud Ahmadinejad during a March 2007 summit meeting.¹²

The presence of U.S. naval force can shape the regional environment in many ways. One that is often overlooked is the ability of naval assets to collect intelligence on a wide range of activities. “Maritime domain awareness,” the development of a “common operating picture” of the movement of ships and aircraft, is a critical tool supporting both national and homeland security. Intelligence can provide warning of emerging dangers, allowing the United States to act to head them off. The presence of Navy platforms may, in some instances, engender restraint on the part of adversaries out of a fear of detection. The U.S. Navy uses a wide range of assets, including surface vessels, manned and unmanned aerial platforms, and submarines, to collect intelligence.

Managing the Balance of Forces. The most straightforward way in which the U.S. Navy can shape the regional environment in the Persian Gulf is by altering its dispositions in that area. Both the quantity and quality of deployed forces can be adjusted in response to circumstances. In effect, force deployments can be treated as a political-military “rheostat” to help establish a more stable

environment. A change in naval force levels or the character of deployed forces can communicate a number of messages simultaneously. The most obvious change in force posture is associated with the movement of carrier battle groups. With respect to deployment of two carriers to the Persian Gulf in April 2008, Lieutenant General Carter Ham, Director for Operations, Joint Chiefs of Staff, said:

It allows us to do a couple of things, by doing that. First, it provides some additional capability to our commanders in the region for additional air power, which is always a good thing. It allows us also to demonstrate to our friends and allies in the region a commitment to security in the region. And importantly, from a military—from a tactical standpoint, operating two carriers in the same maritime and same airspace simultaneously allows us to practice some tactics, techniques and procedures which are very, very useful to us in a relatively constrained area.¹³

The U.S. Navy has a range of other assets that it can deploy in the Persian Gulf to ensure an adequate balance of forces. These include both SSNs and SSGNs (respectively, nuclear-powered attack and cruise missile-armed submarines). Also, expeditionary strike groups could provide a responsive land-attack capability, something particularly valuable during the latter stages of an exit from Iraq.

As U.S. forces are withdrawn from Iraq and the region, in fact, Washington may see it as advisable to increase its naval presence in the region in order to maintain a stable level of military power. Such force deployments can be calibrated to provide additional sea-control, land-attack, and amphibious capabilities as needed. The United States has plans to maintain land-based rapid response forces in Kuwait for the duration of the mission in Iraq and probably thereafter. Sea-based forces could complement those deployed on land.

It is important that the U.S. government articulate the general strategy and purpose behind its long-term force deployment plans. Also, the United States should make explicit the kinds of conditions that would alter these plans. In the past, the routine reliefs on station of one carrier strike group for another have been exaggerated in the media as preparations for an attack on Iran. There is some value in uncertainty. But there is also a value in clarity.

U.S. Central Command (CENTCOM) and the Office of the Secretary of Defense need to consider what would constitute a stable and robust presence in the Gulf area, and they should consider making the general character of that capability known publicly. Changes in naval force deployments could be identified as contributing to the maintenance of a stable balance of forces in the region. Moreover, in the event Iran seeks to increase its military capabilities, additional naval forces could be deployed to counterbalance them and

maintain overall stability. At the same time, not all deployments should be “telegraphed” to Tehran. Altering deployments to the Gulf region on a somewhat unpredictable schedule provides CENTCOM another tool with which to “communicate” with Iran and potentially deter it by maintaining an element of tactical and operational uncertainty, while at same time demonstrating strategic (that is, naval) depth.

The new administration is currently developing its own national security strategy and related force posture requirements, and associated defense budgets. It is likely that tightening budgets will force reductions in current force levels. In making choices of where to reduce forces, it will be important that the administration recognize two facts. First, the U.S. naval presence in the Persian Gulf is one way by which the United States exerts influence over the states in the region; a robust naval presence in the region is required if the Navy is to perform the multitude of missions it has been assigned. In addition, the character of the naval forces deployed is important in American efforts to signal Iran that Tehran does not have a free hand in the region and that its options for using force to achieve its regional objectives are quite limited: “The Middle East isn’t a region to be dominated by Iran. The [Persian] Gulf isn’t a body of water to be controlled by Iran. That’s why we’ve seen the United States station two carrier battle groups in the region.”¹⁴

Second, because of the distances involved, for every ship deployed in the Persian Gulf, the Navy needs at least three more in the fleet to allow for rotation, steaming time, and maintenance. Even seemingly small reductions in the size of the fleet can have enormous consequences for the U.S. Navy’s presence in the Persian Gulf.

Confidence-Building Measures. Since the late 1970s, the Persian Gulf has been an arena of extraordinary tensions. Since that time the U.S. Navy has been engaged in two declared conflicts—DESERT SHIELD/STORM and Operation IRAQI FREEDOM—several individual military engagements, and a host of other military operations. In addition, the region has seen internal conflicts, such as the 1980–88 Iran-Iraq War. American naval forces and those of some two dozen navies have continually navigated the congested waters of the Gulf. It is no surprise that incidents involving military forces, such as the Exocet missile strike on the USS *Stark* (FFG 31) in May 1987 and the January 2008 confrontation between Iranian patrol boats and U.S. Navy warships, continue to occur.

It is all too easy to think that the only U.S. naval options for influencing Iran are those intended to counter the latter’s negative behavior. Far more intriguing is the possibility of employing the American naval presence in the region in ways that might encourage positive behavior. Given the parlous state of the current

relationship between Washington and Tehran, efforts to develop a more positive relationship should start with small, concrete steps that benefit both sides and demonstrate the potential for cooperative endeavors.

Iran and the United States have been in a state of nearly unrelieved confrontation for almost thirty years. Since the Iranian revolution, the United States and

U.S. naval forces are particularly well suited to contributing to shaping activities. Equally important, the same forces can rapidly shift into combat mode.

the Islamic Republic of Iran have had virtually no direct communications. Even their indirect engagements have been limited. This lack of communications is dangerous for all parties. The U.S. Chief of Naval Operations, Admiral Gary Roughead, observes, “I do not have a direct link with my counterpart in the Iranian Navy. I don’t have a way to communicate directly with the Iranian Navy or Guard.”¹⁵ Even more challenging is the gulf that exists between the U.S. Navy and the Iranian Revolutionary Guard Corps (IRGC), which also maintains a significant naval force. Recent incidents involving U.S. naval vessels in the Persian Gulf have involved IRGC units, not forces of the Iranian navy.

The reality is, however, that Iran and the United States do talk to one another constantly. They do so in the context of the day-to-day operations in the Persian Gulf that both refuse to talk about. These are not formal communications but rather the tactical exchanges necessitated by the operation of ships in close proximity; in the cramped waters of the Persian Gulf, American and Iranian military forces communicate daily. As one senior U.S. naval officer has pointed out, “We are operating very close to their territorial waters in a very confined space with a tremendous amount of traffic, be it the small dhows, be it the supertankers going up to the oil platforms. . . . The margin of error is smaller in that the space is more confined. That would be the case even if anyone was your ally, just because of the sheer small size of the Arabian Gulf.”¹⁶

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One approach that can be employed to shape the region’s political environment and, at the same time, address specific issues is the development of confidence-building measures (CBMs). These measures are intended to reduce fear and suspicion and to make the behavior of states more predictable. Typically, CBMs involve the exchange of information, particularly regarding the status and activities of armed forces, and the creation of agreed mechanisms to verify this information.

A recent study by a reputable nonprofit institution identified naval CBMs as one avenue for establishing at some level official communications between Iran and the United States and at the same time addressing immediate, practical security issues. The study proposed an effort to articulate CBMs related to major

security issues. Related to this proposal was another that CBMs start with practical and operational challenges in areas of common interest, such as incidents at sea, drug trafficking, and border control.¹⁷ Success in these areas would result in a number of benefits for U.S. security and that of the region. Agreed-upon “rules of the road” and communications channels for dealing with incidents at sea or interdiction of drug trafficking would benefit U.S. naval operations in the Persian Gulf.

The United States could also seek to cooperate with Iran on a limited basis in carefully selected areas. It would be unwise to push immediately for an “incidents at sea” agreement between the United States and Iran. Instead, the United States should explore the possibility of a series of more limited measures to build up a history of cooperative activities with Iran. One of these might be counternarcotics and countersmuggling. Such cooperation could begin most simply with the U.S. Navy or Coast Guard offering to keep the Iranian navy apprised of American patrol activities. This could then be expanded to exchanges of information on illicit activities and possibly by a U.S. offer to provide Iran with data from tactical intelligence, surveillance, and reconnaissance (ISR) platforms. This type of cooperation was successfully undertaken by Great Britain in the 1990s.¹⁸

The United States could pursue discussions with Iran on CBMs not directly but through the Gulf Cooperation Council (GCC). Although the GCC states and Iran have often been in opposition, they share a common interest in safe passage through the Gulf. In addition, by leading any discussions with Iran the GCC would provide something of a buffer to the low-level U.S.-Iranian dialogue that would naturally occur. The focus should be on engaging the Iranian navy and not the IRGC. Discussions should be very low-key and designed to address issues of mutual interest.

Operate with Allies. As discussed above, the new American naval strategy places great emphasis on cooperation with allies and the development of indigenous naval capabilities. This is an area that has seen tremendous progress since 2001, driven by the demands of the war on terror. The U.S. Navy has conducted numerous exercises involving global allies as well as nations in the Middle East. Many of these exercises are focused on operations other than war, such as humanitarian assistance and civil support.

Effective Theater Security Cooperation activities are a form of extended deterrence, creating security and removing conditions for conflict. Maritime ballistic missile defense will enhance deterrence by providing an umbrella of protection to forward-deployed forces and friends and allies, while contributing to the larger architecture planned for defense of the United States. Our advantage in space—upon which much

of our ability to operate in a networked, dispersed fashion depends—must be protected and extended. We will use forward based and forward deployed forces, space-based assets, sea-based strategic deterrence and other initiatives to deter those who wish us harm.¹⁹

Numerous examples of what the Navy has been doing to improve cooperation with U.S. allies could be mentioned. In November 2007 it began a series of exercises in the Gulf and nearby waters with a five-day crisis-response exercise involving an aircraft carrier, two assault ships, and other amphibious ships, as well as air and medical forces. The start of the exercises coincided with an agreement of world powers in London to move ahead with a third round of sanctions against Iran. Tehran tried to address their concerns about its nuclear program. The purposes of the exercises were described by a Navy spokesman: “Our primary goal is to enforce maritime security including the free flow of commerce through the Gulf for all regional partners. . . . We are committed to keeping the Strait of Hormuz open to ensure that there is a free flow of commerce throughout the region.”²⁰

Cooperative activities and exercises can also be conducted to address scenarios other than potential conflicts. In 2007 the U.S. Navy participated in a disaster-response exercise in the region. The first phase was a tabletop discussion that focused on planning, after which operational assets moved into action and USS *Wasp* (LHD 1) transported relief supplies and equipment ashore to a staging base in Bahrain. The exercise scenario involved a tropical cyclone striking a notional regional nation, destroying its critical infrastructure, shutting down its international airport and desalination and electrical plants, and displacing thousands of citizens. The scenario also included an oil spill from a damaged tanker at sea. According to Rear Admiral Terence E. McKnight, Combined Task Force (CTF) 59 commander, “One cannot predict when or where a natural disaster is going to take place. But we can train to improve our response when a host nation requests our assistance. Coalition forces are committed to helping a host nation that requests our assistance by providing support, security and stability to the region.”²¹

The Navy is aggressively conducting maritime security operations in the region, evolutions intended to combat sea-based and other illegal activities, such as hijacking, piracy, and human trafficking. The CENTCOM Coalition Maritime Forces Component and its subordinate combined task forces (150, 152, and 158) are designed to conduct multinational coalition security activities. Creating combined maritime forces is important in signaling to adversaries the United States is not acting alone. CTF 150, established near the beginning of Operation ENDURING FREEDOM, with logistics facilities at Djibouti, is tasked to monitor, inspect, board, and stop suspect shipping off the Horn of Africa.

Countries recently contributing to CTF 150 include Canada, Denmark, France, Germany, Pakistan, and the United Kingdom, aside from the United States; other nations that have participated are Australia, Italy, the Netherlands, New Zealand, Portugal, Spain, and Turkey. The command of the task force rotates among the participating navies, usually between four to six months at a time. The task force usually comprises fourteen or fifteen vessels.

CTF 152, established in March 2004, is responsible for conducting maritime security operations in the central and southern Persian Gulf. CTF 158 is an international naval task group set up to operate in Iraqi waters. It consists of assets from the U.S. Navy and Coast Guard, the Royal Australian Navy, and the Singaporean navy working alongside elements of the Iraqi navy and the Iraqi marines.

Cooperation involves far more than simply hosting American forces. A wide range of advisory, training, and exercise activity takes place with southern Gulf states, as well as British and sometimes French forces, at the multilateral level.²² Naval Forces Central Command (NAVCENT) conducts maritime security conferences and symposiums in its area of responsibility, such as the Maritime Infrastructure Protection Symposium, in Bahrain 26–28 February 2008. NAVCENT's deployed forces are operationally assigned to the Fifth Fleet, units of which conduct mine-hunting and sweeping exercises and live operations, mine-countermeasures surveys, and explosive ordnance disposal. These activities help ensure the sea lines of communication remain open, guaranteeing the free flow of commerce into and out of the region.

A lack of interoperability, specialization, and orientation around key missions leaves most southern Gulf navies with only limited ability to cooperate in these activities. So does a lack of effective airborne surveillance and of modern mine and antisubmarine warfare capabilities.²³ Saudi Arabia is planning a major modernization program for its Eastern, or Persian Gulf, Fleet that would include surface combatants, helicopters, seagoing tugs, and unmanned aerial vehicles. The Littoral Combat Ship would be an excellent candidate for this program, and its sale would help achieve interoperability. To achieve interoperability, an increase in the number of training exercises with regional navies, either at the bilateral or multilateral level, is needed. Also required will be standard operating procedures, doctrine, and a common data link for shared and improved situational awareness.²⁴

Maritime Domain Awareness. While the U.S. Navy has many options for Phase 0, some gaps have been identified. An important policy recommendation would be to consider improvements that would enhance shaping operations. One of these is to boost surveillance capabilities and improve allied participation to

establish and maintain maritime domain awareness. Such tasks as maintaining tracks on nonemitting vessels that do not respond to hails can make a major difference in the maritime environment. Data for the maritime picture can be fed by many types of surveillance sensors and platforms. What is needed is a careful fusion of information into a common picture, followed by dissemination to those who need it.

One of the most powerful tools available to the United States in shaping regional security environments and empowering local allies is its ability to provide “enablers” that enhance the operational effectiveness of friendly forces. Examples include sensors and surveillance systems, communications capabilities, engineering and logistics functions, simulators, and mission planning. Among the most important enablers are the ISR systems that contribute to maritime domain awareness.

Detering Hostile Actions (Phase I)

A central focus of U.S. military deployments in the Persian Gulf is to deter Iran from taking actions deemed inimical to American interests. The presence of U.S. naval forces in the Gulf, and since 1991 in Kuwait, is a visible demonstration of the interest of the United States in the region and of commitment to secure its national interests and defend allies.

Iran’s actions of principal concern to the United States include its nuclear program, support for extremist groups in the region, assistance to anti-U.S. forces in Iraq, and efforts to undermine U.S. allies. In addition, Iran’s efforts to develop asymmetric capabilities designed to hold U.S. forces and allies in the region at risk or to contest movement in the Gulf must also be considered as potentially destabilizing. American planners must consider the possibility that Iran may threaten to resort to military force should the pressures on Tehran to change its behaviors become intolerable.

Deterrence must include a clear message to Iran that it cannot alter the strategic situation in the region through the use of force, however much it may try. In recent years, Iran has engaged in a series of information operations intended to create the impression that it is capable of exerting its military power in the Persian Gulf. Iranian sources claim that the Islamic Republic’s navy can close the Gulf. To accomplish this, Iran is relying on a strategy of asymmetric warfare—in essence, guerrilla warfare at sea.²⁵

The United States, together with its allies, needs to conduct its own information campaign. This campaign should be accompanied by clear demonstrations—through exercises, fleet deployments, and cooperative activities with allies—that the United States can rapidly defeat Iran’s asymmetric warfare strategy.

The heart of deterrence and dissuasion is the promise of unacceptable consequences. The recipient of the deterrent/dissuasion message must consider either his fate too painful or his gain too small to justify his current behavior. In other words, he must be confronted by the likelihood that the opponent will impose unacceptable costs or negate the effects of his actions. Deterrence theory suggests a number of potential options: preemption/first strike, retaliation, and defenses, either alone or in combination. It may be possible to threaten preemption or retaliation with conventional forces even against a nuclear-armed adversary, although the persuasiveness of a nonnuclear response to a nuclear threat is uncertain.

It is important that a deterrence/dissuasion strategy be, to the greatest extent possible, collective in nature, involving U.S. allies in the region. Obviously, the support of allies would be important to the implementation of most deterrent threats. Equally important, there should be no doubt in the minds of Iran's leaders that the United States and its allies are in agreement regarding responses to Iranian actions. In 2007, Secretary of Defense Robert Gates called for greater cooperation among the Gulf nations in the areas of air and missile defense and the monitoring of local waters as a means of deterring Iran.²⁶ The fact that the United States and its allies, particularly the GCC states, are undertaking serious contingency planning should be part of the deterrent message to Iran.

Offensive Deterrent Options. What kinds of offensive military options might the United States need either to supplement its economic, diplomatic, and other tools to dissuade Iran from resorting to military force? Options for the use of force must be credible and appropriate to the nature of the activities to be deterred. At the same time, the United States must indicate that it can escalate beyond the ability of the Iranian military to respond. Speaking to the idea of using the threat of disproportionate military action to dissuade hostile Iranian actions, defense analyst Anthony Cordesman suggests that

this could mean at least demonstrating U.S. capability to carry out far more punitive strikes. Iran is vulnerable in other areas. The U.S. has no interest in the survival of its gas facilities, power grid, or refineries. It may have underground nuclear facilities, but its reactor facility is vulnerable and so are its military production facilities. Asymmetric warfare is not simply the province of the weak; it is also the province of the strong.²⁷

Deterrent options often require visibility or public disclosure that are not always consonant with the secrecy and surprise that operational consideration would ordinarily warrant. It is reported that most U.S. Navy ships transit the Strait of Hormuz at night, so as not to attract attention, and rarely in large numbers. On at least one occasion, however, a daylight transit was conducted.

Depending on specific circumstances, one relatively straightforward option available to the Navy would be to make certain transits during the day or in relatively large numbers.

Without question, naval forces would play a prominent part in any strike option against Iran. As noted above, the United States has periodically deployed carrier battle groups to the Gulf as a reminder of its offensive and defensive capabilities. The Navy has the option under its Fleet Response Plan to surge carrier forces to the Gulf. This would be a highly visible and potentially provocative action, one that should only be taken when there is a requirement to send the strongest signal to Tehran.

A possible alternative deterrent option could be to deploy one or more of the Navy's four cruise missile-armed submarines to the Gulf region. Unlike the carrier option, this would not be a visible deterrent, but it could be accompanied with an information campaign making clear that the United States was deploying assets of this type to the region.

Defensive Deterrent Options. Iran has repeatedly sought to pursue its own deterrence strategy. This has centered on the threat to contest transit of the Persian Gulf or otherwise interfere with the flow of oil. The Iranian Supreme Leader, Ayatollah Khamenei, has warned, "If the Americans make a wrong move toward Iran, the shipment of energy will definitely face danger, and the Americans would not be able to protect energy supply in the region."²⁸

Iran has deployed a broad range of capabilities to threaten both civilian and military shipping in the Gulf. This includes a large number of small surface vessels, submarines, sea mines, shore-based antishipping cruise missiles, and manned aircraft.²⁹ This capability is intended to support an antiaccess strategy. The former commander of CENTCOM, Admiral William Fallon, has described Iran's increasing military capabilities as focused on blocking U.S. military operations: "Based on my read of their military hardware acquisitions and development of tactics . . . they are posturing themselves with the capability to attempt to deny us the ability to operate in this vicinity."³⁰

The U.S. Navy could counter Iranian threats to itself or commercial shipping in the Gulf, thereby potentially deterring not only such attacks but undercutting a main pillar of Iran's effort to create its own asymmetric threat. The principal deterrent the Navy can provide is the capability to surge large and capable forces into the Gulf region. Such a force must be able to conduct a wide range of missions, strike a broad range of sea- and land-based targets, conduct antimine and antisubmarine operations, and engage in comprehensive ISR.

As the Navy surges into the Gulf, it would have to deal with a number of Iranian antiaccess threats. But in order to cope with some threats, such as sea mines

and small boats, it would be necessary to establish air dominance. The combination of F/A-18E/Fs, F-18 Growler electronic-warfare aircraft, and, when they are deployed, F-35 Joint Strike Fighters will give the Navy a powerful contribution to what will be a joint fight.

Successful air dominance will include area air and missile defense. The defense against cruise missiles is a challenge the Navy is preparing to address. Its Naval Integrated Fire Control–Counter Air (NIFC-CA) program is a “system of systems” that will link sensors, aircraft, ships, and even land-based air-defense missiles to neutralize large numbers of targets at long ranges and all altitudes. This improvement is essential, because missile defense has become a multilayered problem. Threats come from short-range ballistic missiles, cruise missiles, and combinations of them. Cruise missiles can be launched from land or sea, further complicating the problem. The Navy needs to improve its capabilities continuously if it is to maintain unfettered access near Iran.

For example, central to NIFC-CA is the new E-2D Advanced Hawkeye. The E-2D will not only expand the Navy’s surveillance capability but also, for the first time, enable naval and joint forces to conduct effective defenses against cruise missiles. The E-2D will be able to draw threat data from its own sensors and other ISR systems, establish engagement priorities, and match available weapons to targets. Demonstrating this capability in the Gulf could be a significant deterrent to Iranian aggression.

Iran has an inventory of 195 patrol boats and small surface combatants. Most of these are armed with, at best, machine guns and small-caliber cannons. Iran also has three frigates, ten fast attack craft, and another dozen patrol boats armed with antiship cruise missiles. In a 6 January 2008 incident, five Iranian high-speed boats reportedly charged U.S. warships and perhaps even threatened to blow them up. In mid-December 2007, an American warship fired a warning shot at a small Iranian boat that came too close, causing the Iranians to pull back.

One experienced naval officer referred to incidents like these as evincing an Iranian desire to “scrape paint” with a U.S. warship. They convey the determined, committed face of Iran’s navy. Professional as Iranian naval personnel are on most occasions, the clear impression conveyed is that Iranian crews can be very determined and ready to seize opportunities to “shape back,” with posturing activities directed at the United States and other nations.

Navy surface combatants and rotary- and fixed-wing aircraft all can be deployed against the Iranian surface threat generally. The United States has a range of options for dealing with the small-boat threat specifically. In the near future, the Littoral Combat Ship (LCS), equipped with the antiship module, will be an extremely effective means of countering limited Iranian small-boat operations.

One deterrent option that falls in the U.S. Navy's domain of expertise is antisubmarine warfare (ASW). Iran has three Russian-built Kilo-class diesel-electric submarines, armed with advanced torpedoes and mines. More than half of Iran's inventory of modern mines is deployable only by the Kilos. The U.S. Navy is seeking to rehone skills in ASW lost after the end of the Cold War; it will need them if it is to find and neutralize rapidly Iran's submarines. Here the LCS, employing ASW modules, will be extremely effective. So too would be the *Virginia*-class SSN, with its improved sonar, mast-mounted sensors, and weapons systems.

Iran also is seeking to develop a credible missile threat against its neighbors and to American military bases in the region.³¹ The deployment of effective mis-

When thinking about deterring Iran, one thinks quickly of Navy options.

sile defenses could dissuade Iran from pursuing this option or, at the very least, reduce its effectiveness. The United States maintains at least one Patriot Advanced Ca-

pability 3 (PAC-3) battery in Kuwait and is assisting Israel (which Iran has long threatened to target) in the development and operation of its long-range missile defenses.

The U.S. Navy is planning to deploy the Aegis ballistic missile-defense (BMD) system on dozens of surface combatants. This capability could add immeasurably to U.S. capabilities to defeat the threat and hence to dissuade Iran from pursuing a very expensive military program. This effort could begin with a series of exercises and demonstrations in the Gulf. In June 2008 the U.S. Navy conducted a coordinated naval missile-defense exercise in the eastern Mediterranean and northern Persian Gulf. This exercise demonstrated the ability to share data and track ballistic missiles along multiple flight trajectories.³²

Missile defenses can also serve to reassure allies, such as Israel, making it potentially less likely that they would react to a perceived threat from Iran with offensive action. But for this assurance to be credible, the United States would have to station several Aegis-capable ships permanently in the Persian Gulf and possibly also in the Black Sea. In addition, the Navy would need to increase the number of Aegis warships equipped with the new antimissile-capable Standard Missile 2. It has today too few Aegis BMD-capable ships, armed with too few missiles.

The U.S. Navy can provide deterrence options in addition to sea-based forces. Navy aerial assets can be deployed from land bases in the region in a display of American engagement, cooperation with allies, and ability to oppose Iranian threats. The Navy's E-2 Hawkeye air-surveillance/command-and-control and EP-3 intelligence-collection aircraft provide critical support not only to naval

operations but to CENTCOM's overall plans and activities. Deploying these aircraft as early as possible to the Gulf region could demonstrate to Iran the futility of its strategy of deploying antishipping cruise missiles.

The United States can also contribute to its deterrence objectives by improving the capabilities of its allies. Washington needs to press the GCC countries to increase their ability to operate as a combined force both among themselves and with U.S. forces. Given their small populations, their militaries need to focus on quality—in other words, technology—over quantity. These nations should be convinced to invest in air and missile defense capabilities, ISR, mine warfare, and even ASW. Saudi Arabia is pursuing a modernization program for its Eastern Fleet that could see acquisition of ten to twelve Littoral Combat Ships plus helicopters, support ships, and naval tugs. In addition, passive defenses, including hardening of critical facilities, communications, command and control infrastructure, and airfields, should be encouraged.³³

Seize the Initiative/Containing Aggression (Phase II)

The overriding focus of Phase II operations is ensuring the free flow of traffic in the Persian Gulf. This responsibility was made clear by Admiral Kevin Cosgriff, former commander of the Fifth Fleet, when in response to reporters' questions regarding the possibility that Iran might seek to close the Strait of Hormuz he declared that this would be equivalent to "saying to the world that 40 percent of oil is now held hostage by a single country." Cosgriff went on to declare, "We will not allow Iran to close it."³⁴

The primary focus of naval options in Phase II must be preventing Iran from controlling access to the Persian Gulf and from interfering with the flow of oil. A secondary focus is to deny Iran the ability to escalate conflict. In order to achieve both of these objectives, the U.S. Navy must be able to seize the initiative rapidly.

Although a shift from Phase I to Phase II operations would mean that deterrence has failed, it is unlikely to have failed completely. As has been seen in the past, Iranian aggression may be limited. The IRGC may conduct hostile acts but not the Iranian military. Aggression may take the form of deployment of sea mines but not of direct attacks on commercial or military vessels. Iran may take action at sea but not threaten U.S. bases or allies in the region. By ensuring that it is able to respond at the level of aggression demonstrated by Iran, the U.S. Navy can help to limit its scope without offering a provocation that could lead to escalation.

Crisis Communications. One of the important considerations as a crisis evolves into a confrontation or even outright hostilities is the need to avoid conflict by mistake or miscommunications. This would be particularly important in the crowded and often confusing environment of the Persian Gulf. Good crisis

communication is also important in complex humanitarian situations, where the movement of U.S. naval forces might be misinterpreted. For that reason, the U.S. Navy has practiced crisis communications as part of its exercise program in the region, as well as globally.³⁵

An outbreak of hostilities in the Persian Gulf would take place in the context of transformed international news media, which would affect how the entire world responded to the situation. Iran would undertake its own information campaign to influence the behavior of regional parties and world public opinion. As suggested above, it is important for the U.S. Navy to pursue in peacetime options to develop better communications with elements of the Iranian military. Such options might bear remarkable fruit when it comes to the opening of hostilities.

Crisis communications must be part of the Navy's information operations plan. The most likely scenarios involving an outbreak of hostilities should be identified and war-gamed. The Navy can provide CENTCOM and the national command authorities (i.e., the president and secretary of defense) with communications options to support theater operations and global outreach. It is likely that the U.S. Navy and Fifth Fleet have developed options for use in an escalating crisis.

Mine Clearance. One characteristic of past confrontations with Iran has been that nation's indirect use of military means. During the so-called Tanker War of the 1980s, the Iranians engaged in limited operations in the Gulf, using mines deployed from civilian vessels. Iran could again seek to deploy mines surreptitiously.

The ability to neutralize rapidly the Iranian air and naval threats in the Persian Gulf would also be critical to efforts by American naval forces to counter the Iranian sea-mining capability. The Navy has been conducting mine warfare exercises in the Gulf primarily using aging *Avenger*-class mine-countermeasures ships. The Navy is moving to modular counter-mine systems embedded on destroyers, submarines, helicopters, and the new Littoral Combat Ship. Additional exercises using more modern systems would be a valuable demonstration of U.S. capability.

Rapid deployment of minesweeping systems would provide an option for countering a major Iranian threat. The Navy needs to make it easier to surge minesweeping capabilities—both the existing vessels and newer, more capable remote de-mining systems—to the Gulf. The U.S. Navy also should encourage the GCC to acquire advanced minesweeping capabilities.

Antisubmarine Warfare. Over the longer term, one of the more potent threats available to Iran, as noted, is its fleet of Russian-built Kilo-class attack

submarines, armed with antiship cruise missiles and mines. The U.S. Navy would have to move extremely rapidly to neutralize this threat, particularly before the Kilos could lay mines to impede the Persian Gulf shipping channels.³⁶

One possible option would be to destroy the Kilos before they could be deployed. Such a preemptive action could be made conditional on intelligence that they were preparing to deploy. Precision strikes against Iran's submarine platforms could be carried out by Navy strike aircraft and cruise missile-armed ships and submarines.

It would also be possible, albeit more difficult, to find, track, and engage the Kilos under way. To be successful, the U.S. Navy would have to deploy a significant number of airborne, surface, and subsurface ASW platforms and defend these against Iranian air defense and antiship capabilities.

Missile Defense. The Iranian use of ballistic or cruise missiles could be central to the move from Phase I to Phase II. The ability to deploy theater missile defenses rapidly to protect American facilities and forces and allied territory could help control the level of violence and deny Iran the initiative.

Sea-based missile defenses are currently the most widely available, deployable, and flexible capability available to a theater commander. Aegis BMD-capable ships could be deployed to provide effective missile defenses of the Gulf region. One or more ships could be routinely deployed in anticipation of an escalating crisis, providing defense against Iranian preemption. If ships needed to be deployed to the Gulf after hostilities had started, they would be made part of a task force, for protection against other Iranian threats. Of course, any ships deployed would have to be on constant guard for such threats as antiship cruise missiles. A robust, credible ability to deal with the most sophisticated antiship cruise missiles on the market is vital for maintaining shaping options.

For the longer term, the Navy could have additional missile defense capabilities such as a replacement for the cancelled Kinetic Energy Interceptor or a marinized version of the Theater High-Altitude Air Defense System. Such a system could be deployed in the Black Sea or eastern Mediterranean to defend Europe and the United States against long-range Iranian ballistic missiles.

Blockade. What might be done short of war were Iran to move aggressively to acquire a nuclear weapons capability? One of the most powerful (yet potentially dangerous) options is a blockade. In 2008, resolutions were introduced in both houses of Congress calling for increased pressure on the government of Iran by, among other means, prohibiting the import of refined petroleum products.³⁷ Such a blockade would be an obvious possibility should Iran attempt to interfere with the flow of oil or seek to close the Persian Gulf entirely.

But it would also be a potential “weapon of last resort,” for use if nonmilitary efforts to halt Iran’s nuclear program failed.

Once Iran actually built nuclear weapons, a blockade would be a riskier option. Nevertheless, as in the case of the Cuban missile crisis, a blockade might still be a useful option should Iran seek to use its nascent nuclear capability as a shield behind which to attack its neighbors or interfere with the free flow of commerce in the Gulf. The recent United Nations resolution allowing members states to halt and even board North Korean ships suspected of carrying contraband materials is an example of a “blockadelike” action taken against a state that has demonstrated some nuclear-weapons capabilities.

Operationally, such an effort would be well within the capacity of the U.S. Navy. It would involve continuing global surveillance to identify cargoes and ships bound for Iran. Halting and inspecting ships is something at which the Navy is very good.

HOLDING FAST TO MARITIME OPTIONS

It is clear that the U.S. Navy has already made and continues to make a significant contribution to shaping the strategic behavior of Iran. The Navy can provide options for the theater commander and the national authorities across the spectrum of conflict. What is particularly important is the number and variety of options available to support early shaping activities.

In Phase 0 the Navy can take a leading role in providing means for opening communications with elements of the Iranian military. The development of confidence-building measures would both reduce risks inherent in conducting day-to-day operations in the Gulf and provide an opening for improved communications. The Navy can also have a major positive impact on the security of allies in the region through cooperative exercises, educational activities, and the extension of maritime domain awareness. Enhanced cooperation with allies would appear to be the most important option in both Phase 0 and Phase I. In these phases naval forces would be expected to operate in conjunction with other elements of U.S. power, such as the State Department. In the event of conflict with Iran, the Navy—though it would operate with joint and combined forces—would have perhaps the most important strategic role of all U.S. forces. It will be required to ensure that the Gulf remains open to friendly military and commercial traffic and that the movement of oil is not interdicted. The Navy needs to focus on ensuring that it can deal with the most stressing threats to movement in and through the Gulf, specifically sea mines, Iranian submarines and missile-armed patrol craft, and nuisance (even suicide) attacks by small, high-speed boats. An additional important role for the Navy is

the provision of effective missile defense; the ability to neutralize that threat will contribute significantly to deterrence of Iranian aggression.

If the adversarial situation between the United States and Iran persists, the United States will have to address the potential improvements that Iran is likely to make in its military capabilities. Among these would be “triple-digit” surface-to-air missiles, advanced sea-skimming cruise missiles with passive radar seekers, and more capable ballistic missiles. The counter to these threats would be more and better air and missile defenses.

Cynics often point out that military power is a blunt instrument. In the case of Navy shaping operations short of war, recent experience shows the set of tools to be in fact remarkably fine and well adapted to their tasks. Keeping the Strait of Hormuz open, providing an operational architecture for allies, and hemming in Iranian military options constitute major roles for today’s U.S. Navy. Given the high-stakes diplomacy under way now, holding fast to maritime options is indispensable.

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THE NEW SECURITY DRAMA IN EAST ASIA

The Responses of U.S. Allies and Security Partners to China's Rise

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In the theater of East Asia, a geopolitical drama is unfolding. The growing presence of China in regional economic and security affairs—generically referred to

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as the “rise of China”—is changing interstate relations. While the major powers in East Asia are the protagonists, there are no bit players in this drama. Think *King Lear*, not *Macbeth*. China's rise is affecting the perceptions, interests, and policies of all nations throughout East Asia. For the United States, the responses of its allies and security partners are uniquely consequential. These countries are the foundation of American presence in the region as well as the edifice of a regional security architecture that has produced decades of relative stability and prosperity.¹

Much of the prevailing research about regional responses to the rise of China makes this drama sound like a slowly unfolding tragedy for the United States. Many argue that China is rapidly gaining regional influence at the expense of the United States. The use of superlatives abounds in the description of China's rise in East Asia, with the unproven implication that this uniformly redounds to Beijing's benefit and to American disadvantage. Joshua Kurlantzick notably argued that China's “charm offensive” is allowing it to displace the United States as the dominant power in East Asia.²

To understand and evaluate these evolving dynamics, the RAND Corporation conducted a year-long study of the responses of U.S. allies and security partners in East Asia.³ The study sought to answer four questions: How have these nations responded to China? What forces are driving these reactions? How will the drivers change? What are the implications for American regional security interests? The study examined the responses to China of the five U.S. allies in the Asia-Pacific and of Singapore, a major security partner.⁴ The RAND study analyzed the responses of these six nations in four areas: domestic politics and public opinion, economic policy, foreign policy, and defense policy. This structure allowed the study to explore a range of national responses as well as responses across each functional area (e.g., defense policy), generating conclusions about both country-specific and regionwide responses to China. This article highlights the most salient findings from this research.

OVERALL REGIONAL RESPONSES TO CHINA'S RISE

In contrast to much of the current research, China's growing presence and interactions with U.S. allies and security partners are not fundamentally transforming the security order in the Asia-Pacific. China is having an influence on these relationships, but these changes are not as rapid or comprehensive as many presume.

First, the foundation of the U.S. alliances in Asia continues to endure. No allies or major security partners see China as a viable strategic alternative to the United States. The United States remains the security partner of choice, largely because it is the one nation seen as possessing the capability and resolve to balance China. Its allies and partners prefer that Washington do the "heavy lifting" of deterring China and, ultimately, preventing Chinese domination of regional affairs. U.S. allies are all intensely pursuing engagement strategies with China, driven principally by an economic logic. They want to benefit from China's large and growing economy, especially during the current global recession. But these goals exist alongside concerns about China's long-term intentions, particularly its military modernization plans. A recent project by the Center for Strategic and International Studies that uniquely polled elites throughout Asia confirmed this duality. The study found that China was ranked first as the "greatest threat to peace and stability in the next 10 years" and second as the "greatest force for peace and stability" in the next ten years.⁵

Second, China is affecting American relationships with its allies and security partners. On the one hand, China's rise makes some U.S. security commitments more relevant. These countries can interact with China more confidently because they know (and Chinese leaders see) that the U.S. commitments to them and to involvement in Asia continue. On the other hand, allies and partners are

also positioning themselves to benefit from both the United States and China. This is a recalibration more than a transformation. None of these nations want to choose between the United States and China, and all reject having to make such a choice. Also, some of these nations use their interactions with China to generate leverage in dealings with the United States. Some of the smaller, middle powers in East Asia, like the Philippines and Thailand, have attempted such strategies. On balance, U.S. allies and security partners want continued American involvement in the region but sometimes only in certain ways, at certain times, and on particular issues.

Third, China is undoubtedly gaining influence with U.S. allies and partners in East Asia—in the defined sense of looming larger in their economic, diplomatic, and defense policies decisions. This is a natural and inevitable trend. The key question is how it is manifesting itself in these states' regional behaviors. Our research found that U.S. allies and partners in Asia have become more sensitive to some of China's preferences and interests, especially on China's self-identified "core interests" (*hexin liyi*), which now include both Taiwan and Tibet.⁶ There have been several instances in which specific nations have canceled visits and changed policies on these issues due to Chinese intervention. But this too is not terribly surprising. Sovereignty issues resonate with many postcolonial states in Asia and, more important, changes in Taiwan or Tibet policy are seldom costly for these states in the sense of undermining their material interests. Thus, these behaviors are not leading indicators of wholesale accommodation to China.

A related indicator of Chinese influence on these states is that Beijing has been effective at precluding the emergence of "anti-China" containment efforts, to the extent that there was ever a push for such an approach. China has been effective at accumulating "defensive influence," persuading nations to avoid taking actions China deems to be threatening. There is very little evidence that China has accumulated "offensive influence," in the sense of policies that could effectively degrade or dismantle U.S. alliances or security partnerships in the region. In the late 1990s, China tried and failed to offer an alternative regional security architecture, with the promotion of its "New Security Concept." Few nations were interested, or now are, in jumping onto this strategic bandwagon, even in the wake of the Asian financial crisis in 1997–98 and the disillusionment with American responses to it. More recent Chinese attempts to push U.S. allies have backfired, alienating regional states and enhancing their coordination with the United States. Prominent examples include Singapore in 2004 and South Korea in 2006.⁷

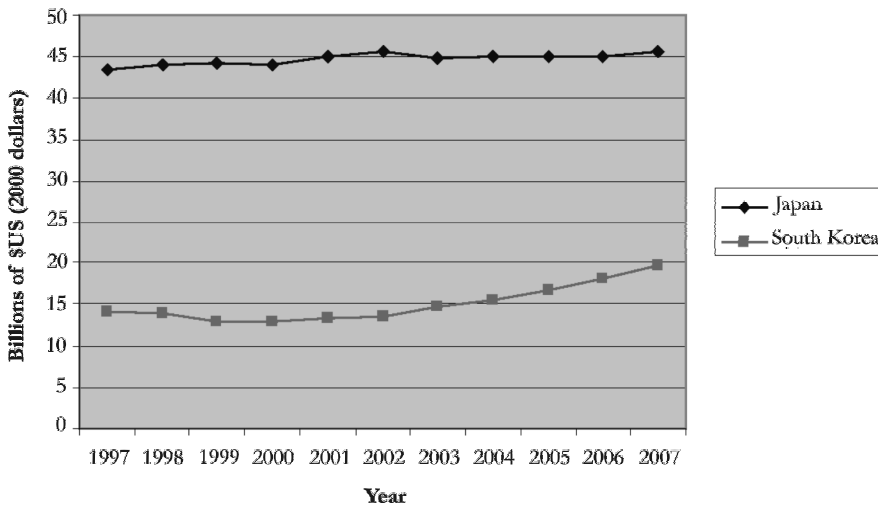
In assessing China's rise in East Asia, two additional considerations are noteworthy. First, China's growing presence and interactions in the region do not

directly translate into influence—that is, using incentives and sanctions to alter other states' behavior. Many analysts too often mistake presence for influence. The fact that countries are trading more with China and negotiating with it in regional organizations does not, ipso facto, imply that China can change these states' policies, especially when policy changes require a state to compromise its material interests.

Second, the regional consensus favoring engagement with China has a tentative quality. There is creeping uncertainty about China's future: some nations fear a weak China, and some fear a strong China. Few are willing to bet their futures on Beijing's assurances about a "peaceful rise." China's large and growing economy (even during the current global recession) is not a geopolitical "tractor beam." While China's economy looms large for all nations, fears of China as a competitive threat have motivated much diversification in trade relations. There are nagging concerns among regional leaders about Chinese military modernization. As People's Liberation Army (PLA) capabilities improve, such as with the likely future deployment of China's first aircraft carrier, and as the PLA conducts more out-of-area operations, these nagging concerns could evolve into closer security coordination with the United States and its allies. The recent statement of concern about China's growing defense budget by South Korea's president during new security consultations with Australia is instructive in this regard.

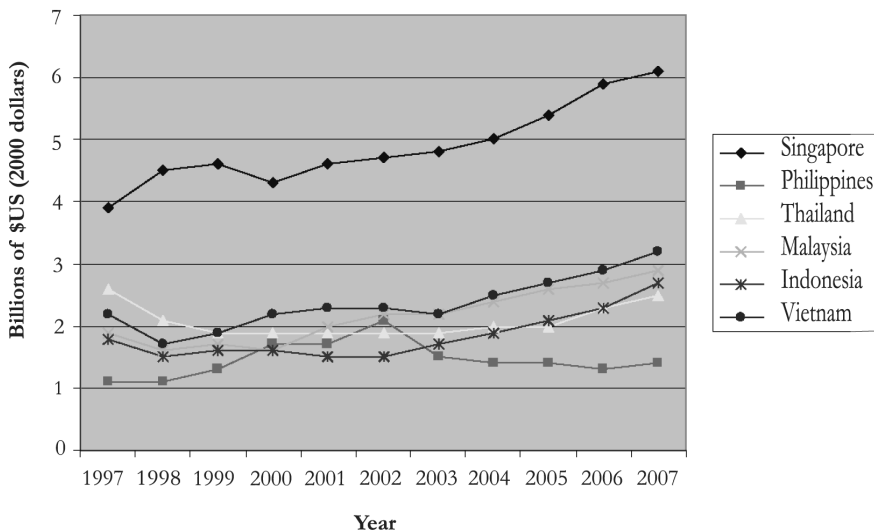
A final regional response to China's rise is a nonevent—the lack of a regional rush, over the last decade, to increase military budgets and modernize conventional forces in response to concerns about China's military. The military budgets of Japan and South Korea have remained relatively flat in *real* terms, with gradual increases in South Korean defense spending. Southeast Asian militaries' budgets did not substantially increase either in the last decade; many just returned to the spending levels of the period prior to the Asian financial crisis (see figures 1 and 2). There are even some notable examples of a deep atrophy in external defense capabilities, such as in the Philippines. That said, Asia could be on the cusp of a limited change in this past trend. Australia's recently released defense white paper calls for a substantial increase in naval capabilities, especially submarines, in reaction to China's sustained naval expansion and the Chinese navy's growing presence in the South and East China seas. But most East Asian states are not likely to initiate major procurement programs in the next five years; many are suffering from the global economic crisis, allocating scarce government resources to much-needed economic stimulus programs.

FIGURE 1
TOTAL DEFENSE BUDGETS IN JAPAN AND SOUTH KOREA, 1997–2007



Source: The data for figures 1 and 2 are from Australia Defence Intelligence Organization, *Defence Economic Trends in the Asia-Pacific* (Canberra: Department of Defence, 2007), available at www.defence.gov.au/dio/documents/2007_DET.pdf.

FIGURE 2
DEFENSE BUDGETS IN SOUTHEAST ASIA, 1997–2007



COUNTRY-SPECIFIC REACTIONS TO CHINA

The particular responses of individual countries provide greater texture for understanding these trends.⁸ Those of Japan, South Korea, the Philippines, Thailand, Singapore, and Australia are summarized below.

Japan

The rise of China in East Asia has clearly stirred Japan's competitive impulses, but its posture toward China remains characterized by considerable ambivalence and

marked by growing anxiety. Many Japanese leaders are more willing than in the past to cite China explicitly as a potential military threat, and the two countries have engaged in heated disputes over territorial boundaries, historical issues, and regional leadership. These three sets of issues will drive competition between China and Japan in the coming years. Japan has edged closer to the United States and strengthened ties with other regional states, from India to Australia to Taiwan—moves that are increasingly justified by reference to China. Tokyo has also demonstrated a new willingness to use its military forces to, for example, patrol ocean areas disputed with Beijing.

At the same time, Japan's businessmen and economic planners remain convinced that their nation's economic well-being is tied to continued trade and investment with China. This remains the case during the current global recession; many in Japan viewed China as having pulled it out of the last recession, which began in the 1990s, and as being able to pull it out of the current one as well. A broad alliance of business, political, and media actors have supported the outreach to China since the prime ministership (2001–2006) of Junichiro Koizumi, and Beijing has reciprocated by taking a more conciliatory posture. Many strategists and politicians also foresee damage to Japan's position in Asia should a cold war develop between Tokyo and Beijing.

The long-term prognosis for Sino-Japanese relations is highly uncertain, and there are certainly grounds for concern about future instability. For the first time, both China and Japan are unified internally, possess substantial and growing economic and military capabilities, and are capable of influencing events beyond their borders. At the same time, the United States is pushing for Japan to assume a larger global role, especially in military terms. Domestically, the demise of the Socialist Party during the mid-1990s nudged the political center of domestic politics to the right. Japan's emergence from fifteen years of sluggish economic growth helped usher in the rise of nationalist sentiments that remain today. At the same time, a new breed of popular politicians has challenged the long-dominant bureaucracy for control of national policy, including foreign policy.

South Korea

The most basic—but not the most complete—answer to the question of what is driving South Korea's response to China is a generally benign view of China and the perceived economic benefits of stable relations with it. Given these conditions, there is considerable sensitivity toward China in South Korea today and reluctance either to challenge major Chinese interests or needlessly stimulate Chinese sensitivities. At the same time, growing concerns and anxieties about Chinese economic policy making and diplomacy show that the honeymoon in

China–South Korean relations is decidedly over. The forces holding the relationship back, if not driving it in the opposite direction, include uncertainties about China’s medium- to long-term intentions (especially regarding China’s military modernization and its growing influence in North Korea), awareness of potential South Korean vulnerability to Chinese economic or other pressure, a widely shared awareness of the importance of the United States, and a continuing gap between South Korean aspirations and capabilities.

These cross-pressures suggest that, first, South Korea will continue to expand ties with China, with trade and investment leading the charge to the extent possible during a global recession. South Korea is likely to emphasize solving actual problems between the two countries, such as implementing confidence and security-building measures that could improve prospects for peace on the Korean Peninsula. By geography alone, sensitivity toward some Chinese interests will remain a characteristic of South Korean policies. Furthermore, the irritants in and constraints on the relationship will also continue, and an occasional spike in tensions is to be expected. As China continues to ensconce itself in North Korea, issues pertaining to the North could come to have as many negatives as positives for bilateral relations. Even short of this, a new strategic alignment between South Korea and China is not likely, in the absence of some major external event. South Korea will likely seek to maintain good relations with China on the basis of—rather than instead of—a continued close alliance with the United States. Another North Korean nuclear test, or clear Chinese unwillingness or inability to bring the North to resolve the nuclear issue peacefully, would reinforce this inclination.

This mixed picture suggests that barring unexpected developments, South Korea will stick with the United States, even at critical decision points that test the U.S.–South Korean alliance, as was the case with American Iraq policy. For Washington the real policy challenge is that China’s rise may complicate its efforts to expand U.S.–South Korean security cooperation. Domestic politics in Seoul will strongly influence this. South Korean agreement to participate in American military operations based out of its homeland will be particularly difficult to obtain, although this will depend heavily on the context in Korean domestic politics, bilateral relations, and international relations. The key to the future of the relationship will be reconfiguring the alliance correctly.

The Philippines

The Philippines’ response to China is strongly defined by the country’s fundamental and myriad weaknesses. Chronic political instability, debilitating domestic insurgencies, and deteriorating external defense capabilities have left the Philippines unable to ensure stability within the main islands, let alone to

protect its offshore territorial claims vis-à-vis China. These weaknesses have spurred Philippine efforts to reestablish close defense ties with the United States, mainly to cope with its own severe internal security challenges. Philippine leaders no longer view China as a major security threat, as they did in the mid-1990s. This ambivalence about China has been reflected in a severe atrophy of Philippine air and naval capabilities in the last five to ten years. However, distrust of China's ultimate intentions remains and is growing in some quarters, driven in part by domestic politics. Since 2007, China policy has emerged as a politically sensitive issue, constraining Manila's engagement with Beijing and lubricating interaction with Washington. Rebuilding of the Philippines' external defense capabilities remains a long-term goal, however.

The Philippine economy is less dependent on trade with China (and on international trade, more generally) than are the economies of some of its Southeast Asia neighbors (e.g., Singapore and Thailand). Like other Asian economies, however, China has become a major destination for Philippine exports, which motivates a perception that trade with China is important to the Philippines' future economic growth. This calculation could be changing as the China-centered processing trade rapidly declines due to the current global recession. A broad consensus in the Philippines over China's importance as an economic partner has, for the past five years, helped to strengthen bilateral ties. Yet the view that China is an important future economic partner is mixed with an incipient sense that China is also a competitive economic threat.

While there are forces driving the Philippines' response to China, it is important to stress that these forces are not "driving" Philippine policy anywhere in particular. The leadership is heavily focused on internal challenges, and the public is relatively inattentive to China and, for that matter, most other foreign-policy issues. To the extent that China has gained popular and elite attention, it has been linked to politically charged corruption scandals that fuel popular concerns about becoming too close to China.

Thailand

Thailand has a long tradition of "bending with the wind." In today's East Asia, that means accommodating—and seeking advantage from—both China and the United States. Among the six nations examined in the RAND study, Thailand was the most likely and willing to accommodate China. Thaksin Shinawatra, the former prime minister, modified this approach by trying to "blow the wind" as well as bend with it. He strengthened political and military, as well as economic, ties with China at the same time as he was taking bold new steps to buttress Bangkok's alliance with the United States. His successors, however, have returned to a more muted style of foreign policy—to the extent they

have the time or resources to focus on foreign policy amid sustained political instability. The post-Thaksin governments have de-emphasized bold initiatives, particularly on the strategic and military fronts, and have refocused Bangkok's diplomacy on the Association of Southeast Asian Nations (ASEAN). Absent the reemergence of a political leader with a strong foreign policy vision and the political space to pursue it, Bangkok will continue to deepen gradually its economic, political, and, to a lesser extent, military relationships with Beijing, as well as with Washington.

While Thai foreign policy has seldom been all in one direction, several long-term trends suggest that relations with China have become more important to Thailand in the last decade. China's value as a trade and investment partner has grown substantially, but recent declines in trade with China could alter this calculation. Thailand has acquired some military hardware from China, and the two nations have conducted two joint military exercises. But these trends pale in comparison to the scope of Thailand's economic and security cooperation with the United States.

There are also limits to the Thai-Chinese relationship. Despite Thailand's past efforts to engage Burma (thereby removing a source of tension with Beijing), Burma's recent instability has once again made it an issue between Beijing and Bangkok. Thai leaders are intensely focused on establishing stability at home, a seemingly endless task since the 2006 coup. When they do focus on foreign policy, they state that they are committed to a balanced posture between China and the United States. Thai policy makers recognize the long-standing material and symbolic benefits of the U.S. alliance. Bangkok is also working to develop options with other countries. Economically, it has strengthened ties with India, Australia, New Zealand, and Japan. Politically and militarily, it cooperates with India, Singapore, Malaysia, and Indonesia, as well as with the United States and China.

China's regional behavior will be the largest variable in the evolution of Thai attitudes toward the rise of China; China has been heavy-handed with Thailand regarding its interaction with Taiwan and Tibet authorities. Events in Burma, the success or failure of ongoing negotiations with the United States and Japan for free trade agreements, and the future of political reform in Thailand are also important variables, albeit less widely appreciated ones.

Singapore

Singapore shows less ambivalence about the rise of China than do most Southeast Asian countries. The country's small size, geostrategic vulnerability, and continuing concerns about long-term Chinese intentions propel it toward a close, strategic relationship with the United States, despite its close ethnic links

to China. Singaporean leaders see the United States as both the principal stabilizer in East Asia and the only realistic counterweight to potential Chinese assertiveness. Keeping the United States actively engaged and forward deployed in the region is a central Singaporean objective. China's rise, the spread of Islamic extremism, and heightened concerns about stability in neighboring countries have prompted Singapore to strengthen security cooperation further with the United States. At the same time, Singapore has expanded security links with the United Kingdom, Japan, Australia, and other nations with stakes in Asia's stability.

The benefits Singapore receives from increasing trade and investment with China, as well as from China's broader economic integration in the region, also drive bilateral relations. These policies are balanced, however, by Singapore's corresponding efforts to diversify its economic relationships to avoid excessive dependence on China. Singapore is doing so by negotiating a range of free trade agreements, in particular with Japan and the United States, as a means of countering China's intensive economic diplomacy; this also helps Singapore entrench the former countries economically in Southeast Asia.

Because of the relative clarity of Singapore's long-term vision, the future of Singapore's relationship with China has a greater level of certainty than that of any other Southeast Asian nation. As China becomes more powerful, Singaporean leaders will do everything they can to ensure a continued balance of power in the region, one in which China does not dominate economic or security affairs. This strategy will almost surely guarantee continued close diplomatic and security relations with the United States and other U.S. allies. However, in the absence of unprovoked Chinese aggression, Singapore will neither encourage nor support "containment" or an explicitly "anti-China" balancing coalition.

Australia

There are distinct cross-pressures in Australian-Chinese relations. First, rapidly growing merchandise trade (mainly in natural resources) and the perception among Australian policy makers that China is key to future prosperity have been the major drivers of bilateral relations. Second, few in Australia see conflict with China as likely or inevitable. Australia wants to avoid being drawn into a regional rivalry with China. Third, Australian policy makers possess a deep uncertainty, mixed with a growing concern, about China's role in Asian economic and security affairs. Recent Chinese investments in Australia's resource sector have prompted a debate about overreliance on China. Beijing's diplomatic activism, especially in the South Pacific, and its military modernization are generating worries among Australian policy makers and strategists.

How will these cross-pressures play out? Canberra will continue to expand its bilateral relations with Beijing, with economic ties at the fore, albeit more tentatively than in the past ten years. Concerns about Chinese investment in Australia and limited access of Australian businesses to key sectors of China's economy are now emerging. As China looms larger in Australia's foreign policy, Canberra will continue to be sensitive to, and will accommodate, some of Beijing's interests, such as its policies on Taiwan. Australia's concerns about China's diplomatic and military behaviors in Asia will persist. This in turn will limit the expansion of Chinese-Australian relations and enable greater alliance cooperation with both the United States and other regional powers. Australia's recent security-policy coordination with Japan and South Korea is notable in this regard.

Under the John Howard administration (1996–2007), Australia's concerns about China motivated a series of foreign and defense policies that expanded alliance cooperation and sought to ensure that the United States would remain highly influential in the Asia-Pacific region. The new Labor Party government, led by Kevin Rudd, has pursued a similar approach. Rudd chose to distinguish his foreign policy from that of his predecessor on global issues—such as Iraq policy, nuclear nonproliferation, and climate change—rather than on China policy. Kevin Rudd has made it clear that while China may be an increasingly important “partner” for Australia, the United States is a “strategic ally.” He believes that a strong alliance bolsters Australia's position in Asia and that the alliance contributes to broader regional stability.

A new and more complex stage in Australia's relations with China (and the United States) began this year with the publication in May 2009 of a new defense white paper, which is Rudd's first and the nation's first since 2000.⁹ This important document cited China's improving power-projection capabilities and uncertainty about both American defense capabilities and the U.S. role in Asia to justify a significant increase in defense procurement. The white paper called for acquiring up to twelve conventional submarines, additional amphibious lift, and land-attack cruise missiles (among other items).¹⁰ Unsurprisingly, Beijing reacted negatively to this assessment, assuming that this procurement was directed at countering Chinese military capabilities. Washington continues to digest the explicit and implicit messages from one of its most stalwart allies in the Asia-Pacific. American strategists should be concerned that some in Australia view U.S. defense strategy and Secretary of Defense Robert Gates's proposed cuts as indicating an eventual inability to maintain robust power projection into the western Pacific.¹¹

ASSESSING THE IMPACT OF THE GLOBAL FINANCIAL CRISIS

The global financial crisis and resulting recession raise numerous questions about economic and security relationships in the Asia-Pacific, including about China's relative influence over U.S. allies and partners. Many commentators have speculated that the current crisis is a strategic tipping point akin to the era just after World War II in which the United States eclipsed Britain as the global economic hegemon. I would recommend much caution in accepting such dire assessments.

First, it is far too early to make such grandiose conclusions about the effects of the crisis on the global balance of power. It remains uncertain how severe and lasting the crisis will be, especially among East Asian economies. Key questions remain unanswered: Who will be hurt the most? Who will recover the fastest, and how? Which states or institutions will help East Asian states recover? It is likely that both the United States and China will play roles—individually, jointly, and in concert with international organizations.

Second, it is uncertain that this crisis increases China's economic clout while diminishing that of the United States. China's economy was challenged by the crisis in ways that highlight existing questions about the sustainability of its current growth model, which emphasizes exports and investment over consumption. The steep declines in aggregate external demand from the United States and European Union (EU) triggered rapid and dramatic declines in China's exports and imports beginning in fall 2008. This in turn led to a reduction in exports as a driver of growth, leaving consumption and investment to carry much of the load. This is the first time in the last thirty years that China has experienced a sustained and deep decline in total trade. The economic effects—both direct and indirect—of this on employment and trade-related investment are highly uncertain. This could prove to be a constraint on Beijing's ability to sustain a moderate level of growth while stimulating greater domestic demand.

Beijing is addressing its predicament through a four-trillion-RMB stimulus package, which seeks to increase internal demand (e.g., consumption and investment) to replace the loss of external demand (e.g., exports). The stimulus package is facilitated by a wave of spending financed by central and local government on infrastructure and real estate projects. (Total bank lending in the first quarter of 2009 was more than in all of 2008!) To boost internal demand, Beijing is making added efforts to stimulate domestic *consumption*, especially in the rural areas, as part of its economic restructuring and, ultimately, the rebalancing of the Chinese economy. Analyses by major international investment banks indicate that China's initial stimulus is working, which has led many of them to revise upward their estimates of Chinese growth in gross domestic product from around 6.5 percent to 7.0–7.5 percent for 2009. In other words, China will

almost certainly recover from the crisis faster than the United States and other major Western economies.

But China's approach may not be as beneficial to its economy as initial indicators suggest; time will tell. China's direct and indirect stimulus spending is probably not sustainable for more than two or three years, given the scope of deficit spending and related bank loans. Government-directed bank lending has been so intensive in 2009 alone that many now worry that China is fueling a new wave of bad debts, which would gut the last round of successful bank reform, initiated in the late 1990s. A key determinant of China's success will be its ability to stimulate domestic consumption as a driver of growth and not simply rely on government-funded investment in order to transition from a short-term policy response to global recession to a long-term strategy for sustainable growth.¹²

Lastly, it remains decidedly unclear that China's projected quick recovery will aid struggling East Asian economies. China's stimulus package may not position it to emerge as a new engine of regional prosperity. In other words, China will not necessarily be East Asia's economic savior. Due to the declines in Chinese imports and exports (as a result of recessions in the United States and EU), the regional network of processing trade in East Asia seems to be unraveling. Asian economies that are both trade dependent and heavily involved in processing trade with China—namely, Singapore, Taiwan, Thailand, the Philippines, and some South Korean sectors—will not enjoy the benefits of stimulus-driven growth in China. These economies are suffering the most right now, and unlike after the Asian financial crisis, they cannot simply export their way to renewed growth. By contrast, regional economies whose trade with China is in capital goods and commodities, such as Japan, Australia, Indonesia, and other sectors in South Korea, will benefit from China's stimulus package. This situation could, over time, result in an adjustment in some regional perceptions of the perils of overreliance on trade with China, leading to diversification in trading partners and bilateral relations.

China does possess an important economic tool that it could use to be viewed once again as the fulcrum of regional growth: outward direct investment. China has the world's largest foreign-exchange reserves, and as a result of reforms initiated in the late 1990s, its major banks and some corporations are de-leveraged and quite profitable—at least for now. Thus, the government has substantial financial resources it could use to invest in East Asia and globally. As the United States and Japan found in past decades, investment in countries can, over time, produce political influence by employing local people and creating a political constituency in favor of the investing nation. There are incipient indicators that China is ramping up its overseas investments—taking advantage of cheap prices

and needy companies. For example, China has accelerated its acquisition of ownership stakes in resource-producing companies in Australia, Russia, Kazakhstan, and Brazil. Chinese outward direct investment will be an important variable to watch in assessing its mechanisms and channels for translating economic capabilities into political influence.

WHICH WAY WILL THEY GO?

The preceding analysis suggests several preliminary conclusions about this evolving geopolitical drama in East Asia. These conclusions represent neither a climax nor a denouement but a developing plotline.

First, the United States remains well positioned to achieve its long-standing regional objectives, however the Barack Obama administration chooses to characterize them. The United States does not face a crisis of confidence, and the foundations of its influence endure. It is still early days in Asia's response to China; most countries are still coming to terms with what it means for China to be a more influential actor. This has prompted an abundance of reactions, including many contradictory ones. Accordingly, there is still abundant geopolitical space for Washington to expand and improve its security partnerships in the region. If the United States is to do so, its Asia policy needs persistent attention. Although the George W. Bush administration's Asia policy left the region in fine condition, renovation of regional relationships is needed. In the face of China's rise (as well as the growing prominence of India and Japan), the United States needs to improve the legitimacy of its role and the credibility of its commitments in the Asia-Pacific. That effort will require an adaptation to the changing constellation of the equities of U.S. allies and security partners. None want to provoke China or be drawn into a containment effort; none want China to dominate the region; none want the United States to leave or even substantially draw down its presence; and all want China to play a major role in managing regional challenges. American policy needs to reflect these changing regional realities.

A second major finding of RAND's work on regional reactions to China was that there was no strong correlation between high levels of economic integration with China and accommodation of it. Japan, Singapore, and Australia all have large, growing, and highly complementary trade and investment relations with China. Their trade with China represents a larger share of their total world trade than that of other East Asian nations, and the business communities in these countries have been, on balance, bullish about China.

However, this is not reflected in their foreign and security policy making in any direct manner. Policy makers in all three nations harbor deep uncertainty about China's future and have growing concerns about its emergence as a

regional security threat. The governments in all three countries have responded in part by enhancing their alliance links with the United States, each other, and others in Asia. Australia has begun to improve its regional power-projection capabilities in particular ways. A distinct diplomatic priority in all three nations is ensuring that the United States remains active and influential in East Asia, so that China does not dominate. For Tokyo and Canberra, Chinese defense modernization is increasingly a factor in their military procurement and planning, a set of assumptions that is poised to become more prominent as the PLA deploys additional power-projection capabilities and increasingly operates outside China's littoral.

A third important finding is that domestic politics matters a lot in determining nations' responses to China's rise. For most East Asian states, China's rise generates a variety of contradictory reactions, some drawing them toward China and others making them wary. What determines which way they go? A key independent variable is domestic politics. The political conditions in East Asian nations and, especially, the views of political leaders mediate the extent to which diplomatic and economic interactions with China result in accommodation of China, alienation from the United States, or both. The changes in South Korean responses to China following the 2008 election of Lee Myung-bak offer a prominent example. Although relations with China had not fundamentally changed by early 2008, President Lee reoriented South Korea more toward the United States and created a permissive environment for questioning Korea's growing reliance on China. Lee has now positioned South Korea as yet another medium-sized regional power raising concerns about Chinese military modernization. Ultimately, the perspectives and preferences of these nations' top leaders will have a defining influence on how they respond to the myriad of challenges posed by China as well as by U.S. policy in East Asia.

NOTES

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1. To be sure, a growing number of voices have called into question the permanence of the U.S.-based security architecture in East Asia. These perspectives call American presence in East Asia a historical aberration following World War II, and they view its current presence as outdated, given the alleged acceleration in regionalism. See Kishore Mahbubani, "America's Place in the Asian Century," *Current History* (May 2008), pp. 195–99.

2. Joshua Kurlantzick, *Charm Offensive: How China's Soft Power Is Transforming the World* (New Haven, Conn.: Yale Univ. Press, 2007). Interestingly, Kurlantzick seems to have stepped back from some of his book's main conclusions; see his "So Far, It Just Isn't Looking Like Asia's Century," *Washington Post*, 7 September 2008.
3. See Evan S. Medeiros, Keith Crane, Eric Heginbotham, Norman D. Levin, Julia F. Lowell, Angel Rabasa, and Somi Seong, *Pacific Currents: The Responses of U.S. Allies and Security Partners in East Asia to China's Rise* (Santa Monica, Calif.: RAND, 2008).
4. The United States has concluded mutual defense treaties with five countries in the Asia-Pacific: Australia, Japan, the Republic of Korea (South Korea), the Philippines, and Thailand.
5. Bates Gill, Michael Green, Kiyoto Tsuji, and William Watts, *Strategic Views on Asian Regionalism: Survey Results and Analysis* (Washington, D.C.: Center for Strategic and International Studies, February 2009), pp. 4–7.
6. In his first major speech in the United States, State Councillor Dai Bingguo characterized the issue of Tibet as a core national interest. He stated, "Taiwan and Tibet-related issues concern China's core interests. The Chinese people have an unshakable determination to defend our core interests." See Dai Bingguo, "Address at the Dinner Marking the 30th Anniversary of the Establishment of China-US Diplomatic Relations Hosted by the Brookings Institution" (Brookings Institution, Washington, D.C., 11 December 2008), available at www.fmprc.gov.cn/eng/.
7. In 2004, China publicly and strongly criticized Prime Minister-elect Lee Hsien Long for a visit to Taiwan following his election but before his inauguration. China's loud and harsh rhetoric raised alarm bells in Singapore about China's growing assertiveness. In response, Singapore subsequently took several steps to broaden its defense and diplomatic ties to the United States. It also took measures to constrain China's diplomatic influence in East Asia, including leading the charge in 2004–2005 to eliminate China's control over the location and agenda of, and participants in, the East Asia Summit. Singapore did not radically alter its Taiwan policy in response to Chinese pressure; Singapore continues to train its military forces at facilities in Taiwan.
8. A similar course of events transpired in South Korea in 2006, when then-Chinese ambassador to South Korea Ning Fukui publicly warned South Korean policy makers to restrict the geographic scope of operations for U.S. forces based in Korea to the defense of the peninsula and not other regional contingencies, such as a Taiwan conflict. This statement piqued latent but growing sensitivities in Seoul about China's meddling in South Korean foreign policy and China's growing assertiveness. This event contributed to a change in the national conversation in South Korea about the challenges and threats posed by a rising China. The 2007 change in government created a more permissive political environment for the reflection of these concerns in national policy making.
8. This section draws from the summary of Medeiros et al., *Pacific Currents*, pp. xviii–xxiii.
9. Australia's Department of Defence then published biennial "updates" to the 2000 white paper—in 2003, 2005, and 2007. For copies see merln.ndu.edu/whitepapers.html.
10. Australian Department of Defence, *Defending Australia in the Asia Pacific Century: Force 2030* (Canberra: Department of Defence, May 2009).
11. For an example of this view see Andrew Shearer, "Australia Bulks Up," *Wall Street Journal Asia*, 6 May 2009.
12. Patrick Chovanec, "Undoing Chinese Bank Reform," *Wall Street Journal Asia*, 7 May 2009.

USING THE LAND TO CONTROL THE SEA?

Chinese Analysts Consider the Antiship Ballistic Missile

Andrew S. Erickson and David D. Yang

For China, the ability to prevent a U.S. carrier strike group from intervening in the event of a Taiwan Strait crisis is critical. Beijing's immediate strategic concerns have been defined with a high level of clarity. The Chinese are interested in achieving an antiship ballistic missile (ASBM) capability because it offers them the prospect of limiting the ability of other nations, particularly the United States, to exert military influence on China's maritime periphery, which contains several disputed zones of core strategic importance to Beijing. ASBMs are regarded as a means by which technologically limited developing countries can overcome by asymmetric means their qualitative inferiority in conventional combat platforms, because the gap between offense and defense is the greatest here.

Today, China may be closer than ever to attaining this capability. In addition to numerous outside reports suggesting Chinese efforts in this area, technical

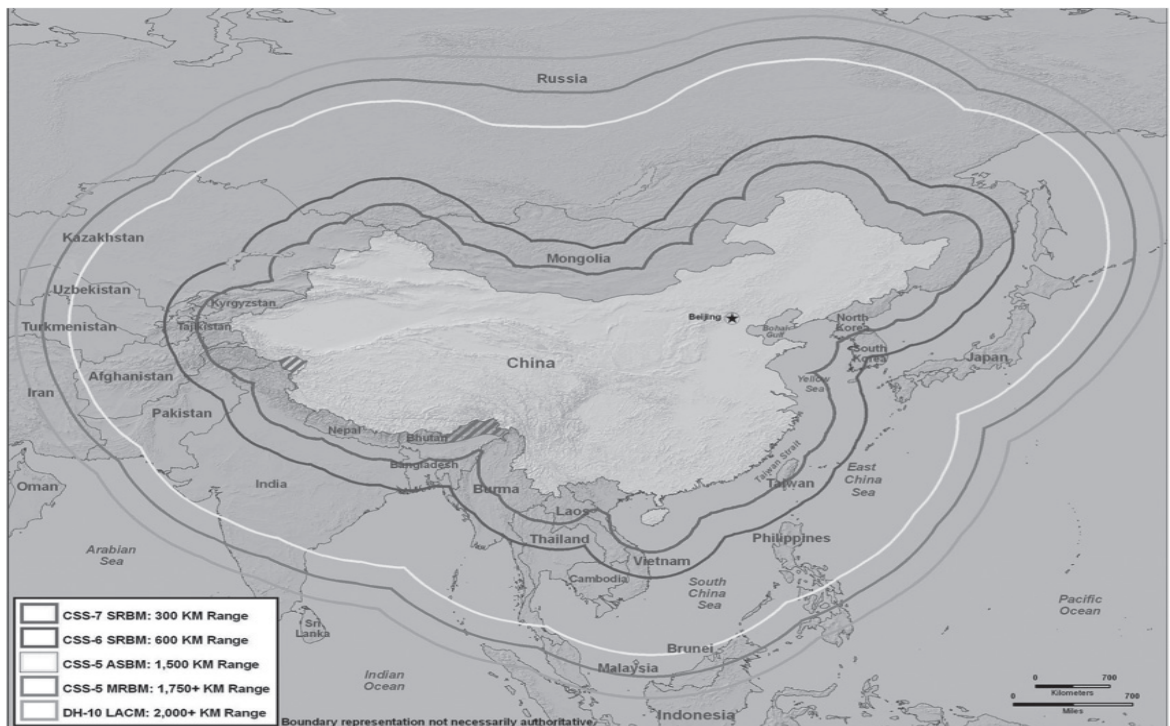
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and operationally focused discussions on the topic are appearing in increasing numbers and in a widening array of Chinese sources, some clearly authoritative. This suggests that China may be close to testing and fielding an ASBM system—a weapon that no other country currently possesses, since the United States relinquished a distantly related capability in 1988. In the view of Chinese and Western analysts, even the mere perception that China might have realized an ASBM capability could represent a paradigm shift,

with profound consequences for deterrence, military operations, arms control, and the balance of power in the western Pacific.

Although open sources do not claim that China currently has a proven ASBM capability, U.S. government sources have stated consistently that Beijing is developing an ASBM based on a variant of the land-based DF-21/CSS-5 medium-range ballistic missile (MRBM). The DF-21's 1,500-kilometer-plus range could hold ships at risk in a large maritime area, far beyond Taiwan and into the western Pacific.¹ According to a 2006 unclassified assessment by the U.S. Office of Naval Intelligence, "China is equipping theater ballistic missiles [TBMs] with maneuvering reentry vehicles (MaRVs) with radar or IR [infrared] seekers to provide the accuracy necessary to attack a ship at sea."² If viable, such missiles, with "high-reentry speed (Mach 10–12) [and] radical maneuvers," would be extraordinarily difficult to defend against, whatever ballistic missile defense the United States might deploy.³ Targeting a carrier with submunitions could enable China to render it operationally ineffective without sinking it, thereby achieving its objectives with a (perceived) lower risk of escalation. If not countered effectively, the very impression of such a risk might deter carrier strike groups from entering the region in the first place (figure 1).

FIGURE 1
MAXIMUM RANGE OF A DF-21/CSS-5 ASBM FROM LAUNCH LOCATIONS
IN MAINLAND CHINA



Note the large area potentially covered, far beyond Taiwan and the first island chain into the western Pacific. This covers nearly all the maritime areas in which China has disputed claims, and provides a substantial strategic buffer zone for most. As published in Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009, Annual Report to Congress*, p. 29.

China has also been working on a sophisticated network of ground- and space-based sensors, including over-the-horizon radars and electronic signals detection equipment. While finding an aircraft carrier has been likened to finding a needle in a haystack, this particular needle has a large radar cross section, emits radio waves, and is surrounded by airplanes. Simply looking for the biggest radar reflection to target will tend to locate the largest ship—and the largest ship will usually be an aircraft carrier.⁴

While the ASBM issue has been discussed for nearly a decade in Chinese official reports and commentaries in various venues, it has only recently garnered widespread public attention in the United States, primarily in reaction to two Chinese articles;⁵ these articles were recently translated, posted, and analyzed on an influential blog affiliated with the U.S. Naval Institute, then covered widely by the media.⁶ But these articles represent merely the tip of a much larger iceberg. In what follows, we will survey open-source Chinese writings on ASBMs to investigate and assess Chinese views on developing, fielding, and ultimately (in a worst-case scenario) using such a system.

EARLY CONCEPTIONS

For over three decades, Chinese leaders and strategists have been thinking of using land-based missiles to hit threatening targets at sea. In 1972, Vice Premier Zhang Chunqiao had significant influence over China's national decision making as one of the Gang of Four, a faction led by Chairman Mao Zedong's wife, Jiang Qing. In an important speech in April of that year he declared, "We are continentalists. Now guided missiles are well developed. Installed on shore, they can hit any target, and there is no need to build a big navy."⁷ By focusing on a specific missile technology, as China had done so successfully since the 1950s, Zhang apparently believed, it would be possible to achieve a transformative strategic effect while devoting China's limited resources to more pressing priorities. Zhang's political career did not survive Mao's passing, and in the ensuing decades China took significant steps toward building the "big navy" that Zhang decried. Meanwhile, however, ballistic missile development remained a key Chinese focus. The American MaRVed Pershing II TBM—deployed in 1983—was studied intensively by the Chinese beginning in the late 1970s, with over fifty related commentaries appearing on this subject.⁸ Such articles faded from more serious technical publications by the early 1990s, possibly because of the retirement of the Pershing IIs following ratification of the U.S.-Soviet Intermediate-Range Nuclear Forces (INF) Treaty in May 1988, as well as any efforts to avoid drawing attention to Chinese application of such technology. In any case, the Pershing II inspired Chinese research in this area and has been cited in Chinese sources as influencing the development of China's family of ballistic missiles.⁹

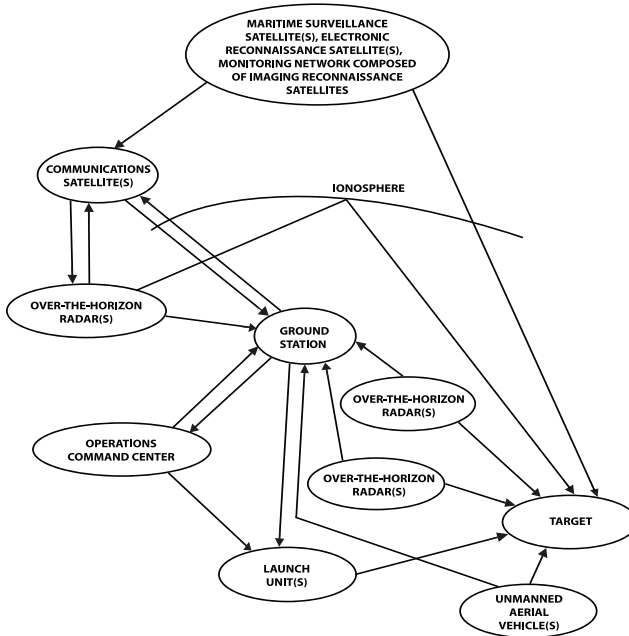
In recent years, Beijing has sought to threaten credibly U.S. military access to strategically vital areas along China's maritime periphery, particularly those surrounding Taiwan. Despite progress toward this end, however, Chinese naval and maritime analysts have written consistently that their nation's naval capabilities are still insufficient to address critical operational threats. Civilian leaders appear to have supported substantial naval development in keeping with China's commercial maritime revolution but continue to prioritize national economic development over military expansion and wish to avoid emulating Soviet mistakes by devoting an unsustainable portion of national resources to the latter. For all these reasons, a widespread but targeted military modernization effort is under way that draws on earlier People's Liberation Army (PLA) traditions of pursuing military objectives from a position of relative weakness. As part of this larger effort, a more balanced version of Zhang's "vision" of ground-launched antiship missile development is apparently being pursued. What must be emphasized is that the idea of striking a ship from land is not new and that the idea of "using the land to control the sea" (以陆制海) in this way is very appealing to China, given its geostrategic situation.¹⁰

This effort has assumed new urgency as part of a larger effort to deter U.S. carrier strike groups from intervening in a potential conflict over Taiwan. If China deploys a successful ASBM in the near future, rapid progress in its development will be traced in part to the 1995–96 Taiwan Strait crisis, which further underscored Chinese feelings of helplessness against American naval power. The deployment of the USS *Nimitz* (CVN 68) and *Independence* (CV 62) carrier battle groups in response to Chinese missile tests and military exercises in the Taiwan Strait was a move that China could not counter.¹¹ We cannot know at this time how the events of 1995–96 affected the precise calculations of Chinese leaders, but they seem to have given a major boost to PLA development in general, and PLA Navy (PLAN) development in particular.¹² Moreover, there is specific evidence that a new impetus was given to ASBM-related research and development at this time (figure 2). As Colonel Larry Wortzel (Ret.), U.S. Army attaché in Beijing from 1995 to 1997, recently testified, "The first time a senior Chinese military officer of the General Staff Department mentioned ballistic missiles attacking carriers was after our two carriers showed up, and he put his arm around my shoulder and said we're going to sink your carriers with ballistic missiles, and we had a long conversation about it. I don't know if they were doing research before that, but . . . the first time it got thrown in my face was 1996."¹³

DISCUSSIONS OF ASBMS IN THE CHINESE LITERATURE: AN OVERVIEW

Given the sensitivity of the issue, relevant statements on ASBM development by top Chinese leaders are currently lacking. But there are ample data to consider

FIGURE 2
CHINESE CONCEPTION OF ASBM TARGET DETECTION AND TRACKING, CA. 2000



**SCHEMATIC DIAGRAM OF TARGET RECONNAISSANCE
 AND LOCATION SYSTEM**

Source: Chen Haidong et al., "Study of a Guidance Scheme for Reentry Vehicles Attacking Slowly Moving Targets," p. 6, fig. 1.

at other levels. Chinese writings on ASBMs in the open-source literature can be divided into three broad categories. In descending level of authoritativeness, these include

1. PLA doctrinal publications describing how ASBMs might be used in operational scenarios
2. Specialized technical analyses of specific aspects of such weapons and their supporting infrastructure
3. Generalist deliberations and didactic discussions on the technical and operational feasibility of such weapons.

The first category comprises official military doctrinal publications. These sources of guidance for PLA personnel illustrate how PLA analysts are thinking about using ASBMs in actual operational scenarios. They are typically written by leading scholars at institutions of professional military education, under the editorial guidance of high-ranking active-duty officers, or sometimes by retired officers themselves. Several doctrinal publications of the PLA as a whole and of the Second Artillery Corps (China's strategic missile force) discuss a variety of ways in which to use conventional ballistic missiles to deter carrier strike

groups (CSGs). This demonstrates that such a possibility is taken seriously by the PLA and suggests that relevant programs are under development, though it leaves unclear to what extent the PLA has mastered the necessary technical and operational capabilities.

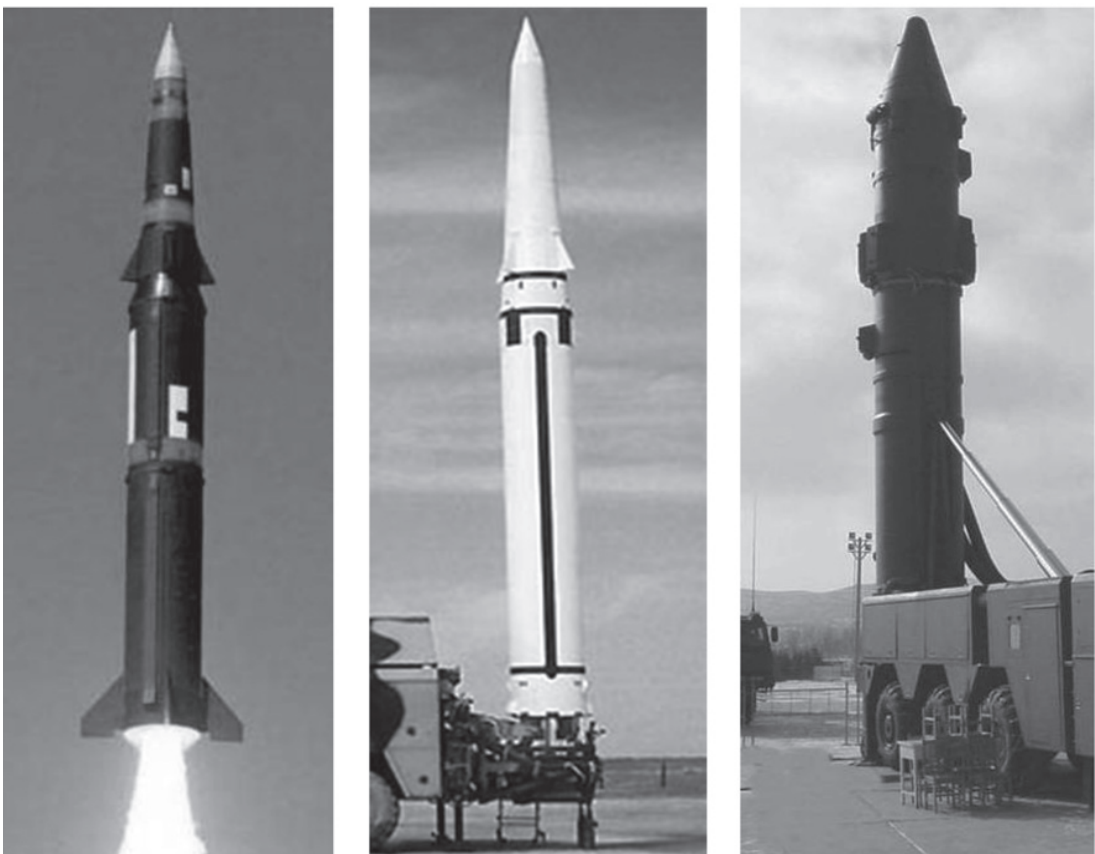
The second category consists of focused technical analyses of specific systems and operations both explicitly and potentially relevant to ASBMs, such as calculations of the maneuvering range of reentry vehicles;¹⁴ another example is the suppression of sea-surface backscattering for maritime surveillance radars.¹⁵ These are written by military and civilian technical analysts, whose names and institutions are typically identified, for an audience in their relevant subfields. Compared to articles on other existing weapons systems (e.g., antiship cruise missiles [ASCMs]), these tend to be theoretical papers utilizing mathematical models, and it is not clear how readily they can be translated into concrete engineering solutions. But some analysts claim that the theories involved have indeed been proved correct, and actual solutions may be contained in other documents. Together, these first two categories of sources offer good indicators that China is pursuing ASBM development seriously; sophisticated intellectual work in doctrine and technology would underpin any such efforts.

The third category consists of generalist deliberations on the feasibility of such weapons. These are written by a variety of naval and maritime analysts (many unidentified), for a broad range of military, defense industrial, and popular audiences, some perhaps for educational purposes. Tremendous disagreement can be encountered in these sources, even on fundamental issues; they demonstrate a range of opinion and debate. More than a few contain technical errors and mistaken assumptions; many, however, offer very specific details.¹⁶ The authoritativeness of these sources is frequently difficult to determine, although many of the commentators are clearly technical experts.¹⁷

While there are clearly differences among the sources, then, it is important to note that areas exist that they all collectively treat as conventional wisdom, issues on which there is no disagreement regardless of forum, institutional affiliation, or individual viewpoint. Chinese commentators agree that an ASBM, if it is to be developed, would be based on an upgraded version of an existing Chinese MRBM, such as the DF-21/CSS-5.¹⁸ A DF-21D variant is reportedly closest to an antiship version;¹⁹ some Chinese writings say this of the C version;²⁰ others refer to future modifications (e.g., a DF-21E).²¹ The prototype for such a weapon is generally held to be the Pershing II TBM; this is an unusual instance in which Chinese analysts do not see Russia as a model for weapons development. At a strategic level, Chinese assessments generally concur that ASBMs, if realized in practice, would offer a variety of operational effects and value for Chinese maritime strategy—particularly vis-à-vis Taiwan. If this vision were

achieved, it could impose significant restrictions on U.S. naval operations during a Taiwan crisis, especially as there are complementary discussions in Chinese writings about holding U.S. theater land bases—such as those on Okinawa—at risk. Acknowledgment in Taiwan and the United States of such a change in the military balance, Chinese observers believe, would deter Taiwan independence and encourage cross-strait reintegration on Beijing's terms. Finally, there is also general agreement as to which are the key technical challenges, including target acquisition and terminal guidance.²² To be sure, there is little discussion in the Chinese literature about specific Chinese capabilities in these areas, only general statements of feasibility and implicit assumptions in doctrinal publications that ASBMs are available for use or will be soon.

FIGURE 3
SIMILAR TECHNOLOGY? AMERICA'S PERSHING II AND CHINA'S DF-15/CSS-6 AND DF-21/CSS-5 MISSILES



According to Chinese sources, a Chinese DF-21 ASBM would be based in part on the U.S. Pershing II (left), as is the DF-15 short-range ballistic missile (center). The U.S. Pershing II has adjustable control fins on its reentry vehicle for terminal maneuver. Positively identified photos of a CSS-5 outside its launch canister are not known to exist. But the DF-15B missile pictured here has a reentry vehicle virtually identical to the Pershing II's. Based on the strong visual resemblance, it is possible that the DF-15B employs terminal maneuvering technology similar to that of the Pershing II. The reentry vehicle that China obviously has here could easily be mated with a variant of the DF-21/CSS-5 booster (right), which might then produce an effective ASBM. (Photos used with permission from China Defense Forum)

Doctrinal Sources

Apparently authoritative doctrinal writings already describe in some detail how ASBMs might be employed. Such references have been hitherto ignored in Western scholarship; this is a case of potentially important information hiding in plain sight. There are volumes devoted to missions for the Second Artillery as part of PLA joint doctrine; the authors were unable to find any doctrinal writings suggesting that other services (e.g., the PLAN) would be responsible for using conventional ballistic missiles to hit targets at sea.²³

Three volumes deserve special scrutiny as perhaps the most authoritative writings available on PLA doctrine concerning the use of ballistic missiles in operational and tactical scenarios.²⁴ Of these, *The Science of Campaigns* and *The Science of Second Artillery Campaigns* have each been “printed and distributed to all military forces, colleges, and universities as a training and learning reference.”²⁵

The Science of Campaigns was written by researchers at China’s National Defense University. The 2006 edition, more sophisticated and joint in orientation than its 2000 predecessor, offers a basic overview of conditions under which conventional ballistic missiles might be used to “implement sea blockades” and “capture localized campaign sea dominance” by “implementing missile firepower assault or firepower harassment attacks against important targets that the enemy depends on for . . . sea-based maneuvering.” This would typically be done as part of a joint campaign with such organizations as the PLAN and the PLA Air Force, with which there is supposed to be “extremely close coordination,” although in unspecified contingencies the Second Artillery might operate independently. Practical aspects, such as the imperative to “react rapidly” and “control the rate of missile consumption,” are emphasized to support a sophisticated strategy aimed at “apply[ing] great psychological pressure on the enemy” and making him think “that no rules apply, thereby achieving the maximum effectiveness.”²⁶

Even more relevant and sophisticated is *The Science of Second Artillery Campaigns*. Published by the PLA Press in March 2004 (but completed in May 2003), it likely serves as a high-level professional military education handbook for campaign-level command personnel in the Second Artillery and the PLA in general. Its chief editor and his deputy have considerable credibility and expertise as top PLA officials. The foreword by the headquarters of the PLA General Staff further indicates that this book is the institutional position of the PLA as a whole and hence has been accepted by China’s civilian leadership, at least in general terms.²⁷

How does the Second Artillery conceive of using ASBMs in operational scenarios? The 406-page document describes the use of ASBMs against carriers

in some detail and without suggesting that such an approach is aspirational or beset with insurmountable difficulties. In fact, in introducing the section describing their potential employment, it states that “conventional missile strike groups” should be used as an “assassin’s mace” (or silver bullet)—a term commonly used in both PLA and less authoritative documents to describe weapons that match Chinese strengths with an enemy’s weaknesses.²⁸

The Science of Second Artillery Campaigns states that the Second Artillery will work with the PLAN to “execute focused naval blockades” and “achieve command of the seas.”²⁹ Approaching enemy CSGs are envisioned to be the principal maritime targets, but “large vessels or large ship formations” more broadly are mentioned as well.³⁰ Coordination and precision are seen as essential for “detering and blocking enemy carrier strike groups”;³¹ such “operational activities need to be coordinated without the slightest difference in time.”³² Coordination with the PLAN is also emphasized in the location of sea targets, as well as with regard to the notification and demarcation of blockade areas: “the naval intelligence department should ‘relay promptly’ the information obtained by its reconnaissance about enemy ship activities to the Second Artillery campaign large formation.”³³ In particular, “information regarding carrier battle groups . . . should be gathered on a real time basis.”³⁴ Potential sources of “real-time target intelligence” include “military reconnaissance satellites, domestic and foreign remote sensing satellites, and established satellite reconnaissance target image information processing systems.”³⁵ While ASBMs are not mentioned explicitly in this context, the need for “further real-time intelligence on the dynamic target” to be obtained through “various measures and multiple channels” is recognized vis-à-vis cruise missiles.³⁶

A two-page section describes five ways to use ASBMs against carrier strike groups, a centerpiece of “military intervention by a powerful enemy” and thus the proper “focal point for attacks.”³⁷ Such tactics as firing intimidation salvos, destroying shipborne aircraft with submunitions, or disabling with electromagnetic pulses the sensor systems of Aegis destroyers are designed to make CSGs retreat or render them inoperable. More specifically, this passage of the Second Artillery doctrine describes

- “Firepower harassment [strikes]” (火力袭扰), which involve hitting “carrier battle groups.”
- “Frontal firepower deterrence” (前方火力慑阻), which involves firing intimidation salvos in front of a CSG’s advance “to serve as a warning.”
- “Flank firepower expulsion” (翼侧火力驱赶), which combines interception of a CSG by PLAN forces with intimidation salvos “launched toward the

enemy carrier battle group opposite our relatively threatened flank” to force it away from the vulnerable area.

- “Concentrated fire assault” (集火突击), which entails targeting the carrier as a center of flight operations: “When many carrier-borne aircraft are used in continuous air strikes against our coast, in order to halt the powerful air raids, the enemy’s core carrier should be struck as with a ‘heavy hammer.’ The conventional missile forces should be a select group carrying sensitive penetrating submunitions and, using the ‘concentrated firepower assault’ method, a wide-coverage strike against the enemy’s core carrier should be executed, striving to destroy the enemy’s carrier-borne planes, the control tower [island] and other easily damaged and vital positions.”
- “Information assault” (信息攻击), which entails attacking the carrier strike group’s command and control system electromagnetically to disable it: “Directed against the enemy’s command and control system or weak links in the Aegis system, conventional missiles carrying antiradiation submunitions or electromagnetic pulse (EMP) submunitions can be used when enemy radar is being used and their command systems are working, with antiradiation submunitions striking radar stations and EMP submunitions paralyzing the enemy’s command and control system.”³⁸

A third document, *Intimidation Warfare*, edited by Lieutenant General Zhao Xijun, Second Artillery deputy commander from 1996 to 2003, echoes many of the statements on strategic signaling outlined in *Science of Second Artillery Campaigns*. It sheds additional light on China’s possible calculus and tactics in various scenarios. Zhao’s team emphasizes the value of demonstration training, tests, and other measures to influence the enemy, in part by influencing media coverage.³⁹

Zhao’s team also suggests four methods to deter enemy ships without hitting them directly. “Proximity . . . sea deterrence strike” involves test launches that impact near a sea-based target. “Two-flanked convergence proximity (or critical) deterrence strike [两翼夹击抵近 (临界) 威慑打击]” involves launching two or more missiles to bracket or encircle a target. “Island crossing attack deterrence strike [越岛攻击威慑打击]” exploits the psychological impact of missiles overflying “strategic targets” when fighting an enemy controlling an island (e.g., Taiwan?). “Proximity aircraft carrier deterrence strike [抵近航空威慑打击]” involves “the launching of missiles toward the flanks or the front of the aircraft carrier battle groups that have entered one’s territorial waters, [to] demonstrate one’s ability and resolve to implement destructive strikes against the aircraft carrier, thereby producing psychological shocks in the enemy and forcing it to leave one’s territorial waters.”⁴⁰

Particularly noteworthy of the wide variety of uses suggested for ASBMs against carriers and possibly other surface vessels in this publication and in *Science of Second Artillery Campaigns* is that at least several would appear to place less of a premium on warhead accuracy, depending on how literally such concepts as bracketing and encirclement are interpreted. Rather, missile range and defense penetration capability would seem to be the key factors. If a MaRV were known to defeat terminal defenses and a demonstration shot defeated the SM-3 interceptor,* only guidance failure would seem to stand in the way of a successful Chinese strike.

Science of Second Artillery Campaigns states that TBMs extend the Second Artillery's strike range, and it seems to assume that the Second Artillery would have ASBM inventory sufficient to permit numerous warning shots. Horizontal escalation in the short run, it argues implicitly, can achieve de-escalation in the long run. Although the Second Artillery's view is that such tactics would be effective, unless it were communicated effectively ahead of time that these were merely warning shots, they could easily be misinterpreted as failed attempts to strike the target and thus have the exact opposite result of China's intent—that is, escalation instead of de-escalation. This potential problem is addressed, in a fashion, in *Science of Second Artillery Campaigns*: one section emphasizes the need for “no-fly” and “restricted navigation zones” and calls for the use of “very precise missiles in order to prevent errors in precision or losing control of the missile when it is in flight such that it enters enemy territory (or an enemy-occupied island), or such that it directly strikes an enemy aircraft carrier.” Otherwise, such errors “could cause the nature of deterrence to change, giving the enemy an excuse to use force.”⁴¹

Technical Sources

Having considered how the Second Artillery thinks about using ASBMs, it is time to examine in detail possible approaches to, and technical challenges in, developing them. The Second Artillery dominates available technical ASBM assessments, implying that it may largely control any Chinese ASBM programs. As the PLA's strategic rocket force, with “equal attention devoted to” (and the vast majority of its recent acquisitions in) conventional forces, and 78.2 percent of its cadres now holding bachelor's degrees or above, it would seem the logical choice to handle such a challenging new mission.⁴² The vast majority of available technical articles devoted explicitly to ASBM issues are authored in full or in part by individuals associated with the Second Artillery Engineering College in Xi'an, suggesting that this institution may be playing a major role in developing ASBM-related programs. Technical analyses also come from civilian institutions in

* The RIM-161 naval surface-launched anti-ballistic missile interceptor, a variant of the U.S. Navy's Standard Missile (SM) series.

Xi'an, itself a major defense industry hub, as well, implying some division of intellectual labor.⁴³ The most prolific contributor is the PLA-uniformed civilian Tan Shoulin, a leading professor at the Second Artillery Engineering College in the Department of Command and Support, who advises master's students and specializes in "missile weapon firepower applications."

Second in institutional prominence is the Second Artillery Equipment Department, in Beijing—with some related publication by the Second Artillery Equipment Research Institute as well. Such involvement may suggest that some degree of procurement, or at least active consideration thereof, is under way. Occasional participation can also be seen from individuals associated with units presumably associated with Second Artillery bases. Such strategic locations as Taiyuan, with its Military Representative Office in Factory 247, also make appearances. Academic institutions in other places—such as the National University of Defense Science and Technology in Changsha and the Beijing Institute of Technology's School of Aerospace Science and Engineering—appear to make contributions as well.

Chinese researchers are studying the problems of target tracking and terminal guidance associated with ASBMs. Technical studies, such as a recent paper by State Oceanic Administration scientists on using synthetic-aperture radar to detect surface ships, suggest that the Chinese have developed substantial expertise in the use of such hardware.⁴⁴ A recent paper by researchers at Dalian Naval Academy offers a regimen of tests and data fusion to "achieve our goals of monitoring and identifying ships in large-scale sea areas by using space-borne optical sensors."⁴⁵ A study by researchers at Beijing Institute of Technology simulates terminal targeting of a moving aircraft carrier using adjoint equations and non-dimensional analysis but states that guidance precision-enhancing technologies still need to be developed.⁴⁶ A mathematical study by researchers at the Second Artillery Engineering College appears designed to demonstrate conceptual feasibility.⁴⁷ Researchers at the Second Artillery Engineering College and Second Artillery Base 55, Unit 96311, Huaihua (Jingzhou), offer a theoretical exploration of the ability of TBMs with terminal-phase guidance and maneuvering capabilities to attack aircraft carriers.⁴⁸

Researchers at the Second Artillery Engineering College and the National Defense Science and Technology University offer a mathematical model of a type of terminal guidance, based on a prediction model of a carrier's movement. Modeling suggests that this method can allow warhead precision to achieve a CEP* of about twelve meters under the most ideal conditions.⁴⁹

* Circular error probability—broadly, the distance from an aim point within which a missile has a 50 percent probability of striking.

In a related paper, researchers at the Second Artillery Engineering College and the Second Artillery Equipment Department present a model for predicting the movement of a CSG that can provide targeting information for land-based TBMs. For the needs of TBM targeting, it would be sufficient to provide predictions with a precision measured in kilometers within a time frame of “tens of minutes.” The paper demonstrates the feasibility of such a forecast system and provides two maps depicting the notional location of an aircraft carrier south-southeast of Taiwan, at the latitude of Hainan Island.⁵⁰

How to cause maximum damage to a carrier most effectively is another common research topic.⁵¹ For example, a PhD and a master’s student at the Second Artillery Engineering College offer a theoretical model for calculating damage effects on large targets with many components—say, a carrier strike group.⁵² The discussions in a large proportion of technical articles focus on the delivery of submunitions by homing ballistic missiles to disable flight operations from carriers, while not addressing directly the problems of target acquisition and guidance. Research on submunitions appears to be extremely widespread and sophisticated, with many writings on how to use them against carrier-based aircraft and against runways at air bases (e.g., those of Taiwan). A pathbreaking U.S. article by William S. Murray provides compelling evidence that the Second Artillery has already developed considerable competence in the latter mission.⁵³

Defeating U.S. ballistic missile defense (BMD) is also seen by many Chinese researchers as essential to attacking a carrier strike group successfully, and it has attracted considerable study.⁵⁴ Researchers at the Second Artillery Engineering College offer a theoretical model of reentry-vehicle maneuvering using “moving mass center” control methods. This involves changing the center of gravity of a warhead by adjusting movable masses within the warhead, thereby modifying its atmospheric flight path. The aerodynamic profile of the warhead would remain unchanged, and the method can be used in conjunction with fins and other conventional control surfaces.⁵⁵

Technical experts working on technical solutions are focused on very narrow, specific issues. One wonders, however, whether their political leaders have “gamed out” the scenarios and considered the consequences as technical capabilities progress. The danger with a lopsided focus is that without a proper understanding of the potential strategic risks involved, technical achievements can have dangerous consequences. According to some interpretations, China’s 11 January 2007 antisatellite test offers a cautionary example of Beijing’s civilian leadership approving the trial of a weapon long in development without understanding fully its scope or strategic ramifications.⁵⁶

Whatever the exact strategic calculations (or lack thereof) of the political leadership (authoritative sources are silent on the point), the ASBM issue has been vigorously debated by Chinese commentators in various unofficial venues. Some of these individuals may be privy to internal deliberations or even play roles in shaping policy, particularly in specialized subject areas. When politics or bureaucratic maneuvering comes to the fore, they may become caught up in larger competitions of ideas. But even the views of those not directly involved in the policy process often matter; their ideas may inform policy makers directly or even be adopted. Some analyses may well be informed by parallel debates in official circles, and even be designed to help justify or “socialize” already established policies—for instance, through didactic exploration of important concepts. For that, we turn to the generalist literature.

Generalist Literature

Though, as we have seen, the doctrinal literature is the most demonstrably authoritative category of open-source writings, with technical literature often roughly equivalent, care must be taken in extrapolating actual capabilities from these sources. Available Second Artillery technical articles and mathematical feasibility studies devoted explicitly to ASBM issues do not detail concrete Chinese capabilities.⁵⁷ Even doctrine may reflect aspirations or projected capabilities rather than the existence of hardware and infrastructure. In fact, Chinese doctrinal publications often discuss theoretical capabilities as if they existed, which U.S. joint publications typically do not.

For all these reasons, it is useful to examine the less clearly authoritative but more diverse and detailed generalist literature, with its widespread debate on all major aspects of ASBM development and employment, for indications of challenges and dilemmas that China might face. Regardless of the actual status of Chinese ASBM development, these opinions matter: perfecting and deploying such a weapon would entail resolving a wide variety of complexities and policy considerations and transcending many industrial and bureaucratic boundaries. Any remaining challenges in the technical data fusion required for ASBM guidance and targeting may pale in comparison to the bureaucratic “data fusion” needed if such a program is to succeed over time and such a weapon is to function effectively in combat.⁵⁸

Strategic Rationale and Scenarios. There is broad (though not complete) consistency in the generalist literature concerning the operational effects of ASBMs and their potential value for Chinese maritime strategy writ large. Antiship ballistic missiles are promoted as a means to overcome conventional inferiority (by exploiting technological asymmetry), deter intervention, give China more maneuvering space, and offer both escalation control and an “assassin’s mace” for victory if deterrence fails.

Of supreme importance to Beijing is Taiwan's political status. At the strategic level, Beijing seeks to deter Taipei from declaring independence, progressively constrain its political space, and encourage eventual reunification, with a wide variety of hard- and soft-power tools. Tactical ballistic missiles are thought by one analyst to offer China a "third" alternative to the risk of engaging in outright attack, on one hand, and the limitations of soft power, on the other. Termed "attacking without entering," a TBM campaign is seen by this observer as increasing China's strategic options while limiting Taiwan's.⁵⁹ In addition to their psychological and deterrent effects, ASBMs (as a category of tactical ballistic missiles) are believed to offer China a way to exert hard-power pressure and convey strategic signals in scenarios that do not rise to the level of war. This would seem in concert with Chinese strategic writings, which often express considerable confidence that China can manage strategic escalation in measured increments with a high degree of certainty. At the operational level, facing the possibility of intervention by a technologically more advanced navy in the event of a Taiwan conflict, the PLA seeks an asymmetric "silver bullet" that will (ideally) forestall intervention in the first place or, in a worst-case scenario, offer the ability to attack platforms that are perceived to threaten China. Antiship ballistic missiles promise to further this strategy at far lower cost than force-on-force approaches. Three PLA officers from the Second Artillery Command Academy declare that "guided missile forces are the silver bullet for achieving victory in limited high-technology war."⁶⁰

A professor and a student at the Air Force Engineering Academy evoke an analogous concept when they write that ballistic missiles enjoy a higher probability of penetration than other antiaccess weapons: "Tactical ballistic missiles" have become "the 'poor country's atom bomb.'"⁶¹

In addition, TBMs are regarded by their proponents as an important instrument in China's overall strategic tool kit. One of the most nuanced analyses on the issue, an article published in the China Shipbuilding Industry Corporation (CSIC) journal *Shipborne Weapons*, states that tactical missiles "provide China with more maneuvering space for military and political strategic operations on its eastern, maritime flank."⁶² More specifically, the creation of a

tactical ballistic missile maritime strike system . . . will establish for China in any high-intensity conflict in its coastal waters an asymmetry, in its favor, in the deliverance of firepower and so will remedy to some extent China's qualitative inferiority in traditional naval platforms. Further, the existence of this asymmetry would set up for both sides a psychological "upper limit" on the scale of conflict. This would enable both parties to return more easily "to rationality," thereby creating more space for maneuver in the resolution of maritime conflicts.⁶³

Skeptics writing in another CSIC publication, *Modern Ships*, by contrast, reject both of these points, arguing that ASBMs offer limited power-projection capabilities, are highly escalatory if employed, and might in fact trigger nuclear retaliation.⁶⁴

How Chinese strategists assess the impact of ASBMs for various conflict scenarios is far more difficult to evaluate. Few articles address this topic. One that does states that “the PLA must use all of its electronic warfare and reconnaissance assets properly, must neutralize enemy antimissile systems and missile sensor systems, and should use electronic jamming on the enemy fleet. Such combined kinetic and electronic attacks help the PLA attack an enemy fleet . . . with a combination of explosive, antiradiation, and fake warheads to deceive enemy radar and sensor systems and defeat a deployed battle group or one in port.”⁶⁵

A 2007 article offers a minutely detailed scenario of a notional attack sequence. But it is divorced from larger strategic events, based on some questionable assumptions, and written by a journalist with no professional background in defense affairs.⁶⁶ No known sources mention directly any scenarios beyond Taiwan.

In any case, the concept hinges on technical feasibility (the subject of the next section of this article). Chinese discussions of ASBM employment typically center on their use to deny U.S. carrier strike groups access to waters relevant to a Taiwan conflict, presumably to the east of the island, and hence to the airspace over the strait and even over the island itself. The idea seems to be to hold carriers back through deterrence and to attack them if they come forward.

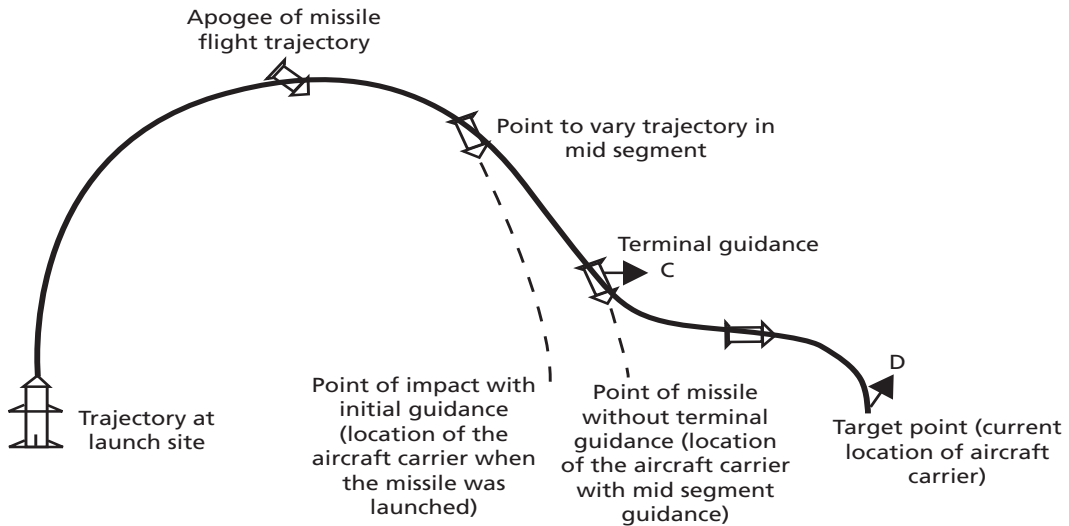
At the same time, ASBMs are recognized to have significant limitations, even potential dangers. According to one analyst, they “cannot replace aircraft carriers, submarines, and other traditional naval weapons”: they “can be used to destroy enemy forces at sea but not to achieve absolute sea control, let alone to project maritime power.”⁶⁷ Two writers in *Modern Ships* go much farther, declaring that while ASBMs are technically possible, their employment in practice is fraught with difficulties. These can be overcome, in their view, if one is dealing with a minor power, but not with a superpower like the United States.⁶⁸ One claim they make, as have others, is that reducing the speed of the warhead in the terminal reentry phase in order to operate its guidance radar makes it more vulnerable to anti-ballistic missile interceptors. To some extent this depends on one’s assessment of the maneuverability of the warhead in its terminal entry phase, but the authors of the *Modern Ships* article are highly skeptical. They acknowledge that the problem may be overcome to some extent in a saturated attack, but they insist that the Aegis defense system is designed to deal with just that. They also point to the relatively high costs of ballistic missiles. Further,

they suggest that the use of ballistic missiles in a saturation attack would “likely lead to the scenario described by ancient Chinese strategists, in which the weapon in question becomes unusable in practice” because its use would be highly escalatory: “Apply little force, and no real harm can be done to the enemy; apply great force, and the first harm is done to the self.”⁶⁹

Even if ASBMs were indeed successfully developed, by virtue of an overwhelming investment of resources and energy, the *Modern Ships* authors contend, a critical problem would remain: whether anyone would dare use such weapons in an actual conflict scenario.⁷⁰ The authors seem to suggest that while conventional tactical missiles could be used against Taiwan with little risk, their employment against U.S. carriers would immediately create a grave political problem: “Since the introduction of nuclear weapons, all the major nuclear powers have developed ballistic missile warning systems against possible nuclear attacks, and there has not been a single precedent of a major nuclear power attacking another with ballistic missiles.”⁷¹ As no technology today is capable of distinguishing between a conventional and a nuclear warhead prior to detonation upon impact, the authors worry that any ballistic-missile attack against another nuclear power might activate its strategic retaliation mechanisms and trigger a nuclear conflict. The *Modern Ships* authors emphasize that in any conflict scenario, the extreme psychological duress to which the military personnel of both sides would be subjected would make it particularly dangerous to employ ballistic missiles, as any small mistake in judgment might trigger a nuclear Armageddon.⁷² Even absent any misperception, sinking a ship that is a symbol of American power and has a crew of thousands could provoke a very serious response. Of course, elements of the PLA, and even their civilian leaders in a crisis, might be less cautious than these analysts. Another writer, having reviewed their performance in battle since the 1960s, concludes that TBMs are indeed, as others have argued, an “assassin’s mace,” a silver bullet.⁷³ A Chinese interlocutor has told one of the present authors that the Second Artillery is itself considering placing nuclear and conventional warheads interchangeably on the same types of missiles—for example, the DF-21—so that they will “possess both nuclear and conventional [核常兼备]” capabilities. This last may be evidence of open debate, of manipulation of American opinion, or of sensitization of the United States to operational implications. If the latter, there is a clear risk of misperceptions in the event of launch in a conflict.

The question of operational control is not addressed directly in the open sources, but the content of doctrinal publications, the large number of Second Artillery officers writing on the topic, and the current responsibility of that arm for the vast majority of nuclear and conventional ballistic missiles suggest that the Second Artillery is likely to have sole responsibility for ground-based ASBMs.

FIGURE 4
SCHEMATIC DIAGRAM OF ASBM FLIGHT TRAJECTORY WITH MIDCOURSE AND TERMINAL GUIDANCE



Note the depiction of control fins on the reentry vehicle, which would be critical to steering the ASBM through terminal maneuvers to evade countermeasures and home in on a moving target. This makes an ASBM different from most ballistic missiles, which have a fixed trajectory. Published by individuals affiliated with the Second Artillery Engineering College and a Second Artillery base in a Chinese technical journal.

Source: Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, "Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile(s) Attacking Aircraft Carrier(s)," pp. 6–9, republished in Office of the Secretary of Defense, *Military Power of the People's Republic of China 2009, Annual Report to Congress*, p. 21.

(The possibility of rivalry and divergence of viewpoints that may result between the Second Artillery and the PLAN will be addressed later in this article.)

Technological Feasibility: Convergence and Divergence of Views. Chinese doctrinal debates about the utility of ASBMs are closely related to widespread disagreements over their technical feasibility. Analysts generally concur that five major technical challenges must be surmounted to achieve a functioning ASBM: detection, tracking, penetration of target defenses, hitting a moving target, and causing sufficient damage (figure 4).

Detection: Pessimists claim that carriers are too small relative to the potential search area to be easily detected by satellite images. Optimists maintain that carriers—with their broad constellation of electromagnetic signals—can be detected in a variety of ways, such as with space-borne sensors.

Tracking: Skeptics maintain that requisite satellite coverage is unattainable, as are sufficient naval vessels and surveillance craft, as well as overseas bases for signals intelligence. They believe that China's other tracking methods are inadequate, even in aggregate. Strangely, they seem to overlook the possibility that China's combination of land-based radars and satellites—perhaps augmented temporarily with deployment of unmanned aerial vehicles and launches of (micro)satellites—might be sufficient to track and target carrier strike groups within a certain zone off China's coastal waters from which it believed essential

to exclude them in combat.⁷⁴ Both Chinese and Western sources, for instance, suggest that China already has relevant over-the-horizon (OTH) backscatter sky-wave and OTH surface-wave radars.⁷⁵

Target defense penetration: The claims of skeptics that slowing the warhead for terminal guidance makes it prohibitively vulnerable to interception seem unpersuasive based on known physics principles. A wide variety of Chinese sources suggest using multiaxis saturation attacks (e.g., involving submarine-launched cruise missiles as well) to overwhelm CSG defenses, apparently without acknowledging the difficulty of coordinating them.

Hitting a moving target: How to strike a CSG that moves during the processes of location, data transmission, and ASBM delivery? Skeptics contend that ballistic missiles are less accurate than cruise missiles and that while a ballistic missile's trajectory is fixed, its target is mobile and may escape between launch and impact. But researchers at the Second Artillery Engineering College maintain that as long as the initial ASBM trajectory is reasonably accurate, appropriate homing corrections can be made. Other researchers suggest improving precision with passive radiation homing and by activating terminal guidance at higher altitude to allow the seeker to scan a larger sea area. One researcher recommends selecting opportune moments for attack: "Even a tiger takes a nap [老虎也有打盹的时候]."⁷⁶ Thus, they contend, carriers can be targeted when flight operations or at-sea replenishment impede their mobility.

Causing sufficient damage: While a few experts make a show of detailing carrier damage-control equipment, one wonders from their tone if they are not being a bit disingenuous. The conventional wisdom seems to be that a multiaxis saturation attack (to defeat defenses) or submunitions (to distribute damage), delivered accurately, can achieve a mission kill by targeting critical exposed areas, such as the carrier's aircraft, island, or C4ISR* equipment.

ASSESSMENTS

Available Chinese literature follows a logical pattern of ever-widening concentric circles of awareness and, to a lesser extent, involvement. This supports the axiom that the longer something goes on, the more likely people are to hear about it. At the center, authoritative PLA publications assume an (eventual?) ASBM capability. Farther out, a variety of institutes are working to validate specific concepts and perhaps also technologies to support such a capability. Beyond these inner circles, a wide range of individuals, whose access to internal information probably varies markedly, are beginning to weigh in with diverse opinions and institutional interests. Few writers in the generalist literature make a balanced, nonpartisan argument along the lines that ASBMs are feasible but

* Command, control, communications, computers, intelligence, surveillance, and reconnaissance.

a bad idea or a good idea but technically infeasible. This suggests a general pattern of institutional biases and competition, with individuals favoring precisely the outcomes that would benefit their organizations most. These opinions and interests matter. Many of the projections of technological “hurdles” outlined above are either demonstrably pessimistic or will likely be obviated anyway over the next few years as China continues its rapid aerospace development. Rather, China’s ASBM future may be a policy, not a technical, question. For now, as capabilities are being developed, technical discussion is being elevated to strategic discussion, but that could well change if Beijing’s leaders ask one day: Now that we have an ASBM capability, what can we do with it?

Nonetheless, debate continues in China’s generalist literature over the technical feasibility of ASBM operations, with only two writers claiming directly that China has ASBM capabilities.⁷⁷ This may suggest that there is ongoing disagreement in China concerning how to develop these weapons at present and how they could best be placed into operation. Now that China has what could be termed a public and military-intellectual complex, organizations analysts and policy entrepreneurs may be jockeying for position in an attempt to influence the course of decision making on the part of at least two of China’s armed services, its military leadership, and ultimately its civilian authorities.

The overall discussion seen so far is best characterized as “contentious.” The three technical challenges most consistently emphasized are real-time satellite reconnaissance, target tracking in terminal reentry, and terminal maneuvering. Some problems that are presented as insurmountable by some analysts are approached more sanguinely by others. Foreign subject-matter experts could glean significant insights from the multitude of relevant Chinese technical studies.

Particularly noteworthy is that direct claims of existing Chinese capabilities in these areas are extremely limited. In other words, the focus of the discussion is on feasibility rather than actual Chinese capabilities. Researchers at the Second Artillery Engineering College make a variety of feasibility claims, in one instance stating specifically that the technical hurdles to successful ASBM employment have already been resolved, but they cite English-language technical papers as authority for this particular point (though they use sophisticated Chinese sources to support other details of their argument).⁷⁸ Again, they emphasize technical feasibility without reference to current Chinese capabilities. It is likely that some Chinese authors do not know what those capabilities actually are, while others cannot say.

Several other issues, though not directly addressed by the Chinese authors surveyed, may merit further attention.

Possible Interservice Rivalry

A noticeable pattern in the tone of ASBM analyses may be interpreted as signs of Second Artillery–PLAN bureaucratic competition. Momentum, direction, and contention about programs may reflect diverse institutional interests. The Second Artillery produces many technical analyses, but not a single one appears pessimistic. Articles written by analysts and students associated with the Second Artillery tend to take the feasibility of ASBM development for granted, perhaps because an ASBM program would be (or now is) controlled by the Second Artillery, thereby furthering its institutional interests.

By contrast, the vast majority of analyses affiliated with the PLAN and the state shipbuilding industry suggest that ASBM development is technically problematic or that use would have dangerous unintended consequences.⁷⁹ Perhaps this is because ground-launched ASBMs would not be controlled by the navy and could divert resources otherwise earmarked for naval development. The PLAN may also be lobbying hard to begin serious aircraft carrier development of its own and does not want this effort undermined by constant emphasis on carrier vulnerabilities—which have played a major role in previous Chinese carrier discussions, at least at the generalist level. We may thus be witnessing some elements of Chinese bureaucratic resource-allocation politics, cloaked in strategic debate and the flag.

In an interesting suggestion of at least some cooperation between the Second Artillery and the PLAN on antiship ballistic missiles, however, an individual from the Navy Representative Office in Chengdu, Sichuan, is a coauthor with researchers from the Second Artillery Engineering College on two ASBM-specific articles. This is precisely the sort of interaction that one would expect if the Second Artillery were charged with directly developing and testing an ASBM, in which case the PLAN would second representatives to relevant Second Artillery facilities to make sure that weapons produced addressed PLAN needs.⁸⁰ Moreover, such PLAN-affiliated institutions as the Dalian Naval Academy and the State Oceanographic Administration conduct extensive research on related topics like ship detection and tracking.

Pressing questions remain, however. What role would the PLAN play in operations that clearly affect its geographic area of responsibility? How would joint operations be coordinated among the Second Artillery, the PLAN, and other services—particularly given the PLA's previous limited ability in joint operations?

Cost-Effectiveness

Beijing's actual development and deployment of ASBMs, and implications for any bureaucratic competition between the Second Artillery and the PLAN, will

also hinge on decision makers' perceptions of their relative efficacy and cost-effectiveness (e.g., vis-à-vis cruise missiles), as well as their marginal development cost. The relative cost-effectiveness of various antiaccess weapons can be derived from both physical principles and Western and Soviet experience, both of which have been widely discussed in open literature.

Many Chinese analysts have regarded such traditional weapons as attack submarines and antiship cruise missiles as the primary weapons against carriers, with no more than cursory references to ASBMs. Other Chinese sources claim that cruise missiles are superior to ballistic missiles for certain missions, particularly in terms of general use, agility, and target selection. According to the U.S. defense analyst Thomas Mahnken, cruise missiles have many advantages over ballistic missiles for a country like China: they are cheaper, it is easier to make them highly accurate, they require simpler launch platforms and support equipment, and they "approach their targets from different azimuths than ballistic missiles [and] hug the ground."⁸¹ Further, cruise missiles can be delivered by aircraft, as well as by ships, submarines, and ground launchers.

ASBM advocates make several strong points, however. Cruise missiles have a variety of disadvantages, including the much longer time of flight (with obvious targeting implications); the need to fly long ranges at high altitudes, where they are much more vulnerable to being shot down; conversely, low operational ceilings at long ranges (thus making it harder to fly over mountains, such as Taiwan's); shorter maximum ranges than ballistic missiles; and difficulty in identifying targets correctly. In an interesting example of PLAN-affiliated individuals claiming that ASBMs have advantages, researchers from the Naval Aeronautical Engineering Institute use mathematical analysis to calculate that "when using ballistic missiles to carry out attack operations on [naval vessel formations], the probability of penetration can reach 95%." This is a much higher success rate than those they calculate for cruise missiles.⁸²

Antiship cruise missiles must often be fired from aircraft, surface vessels, or submarines that approach close to enemy forces to compensate for reduced range. This, and their relatively long flight times, increases their vulnerability (albeit less so for submarine launches), and hence also their cost. However, the ASCM shooters themselves are not necessarily more expensive just because they are vulnerable and might be lost in combat; some (e.g., the Type 022 *Houbei* missile catamaran) are likely considered disposable, with loss in combat assumed. A mobile land-based ASBM, though requiring substantial development and infrastructure investment, would be much less vulnerable to destruction before launch. Two Chinese observers estimate the unit cost of an ASBM and its launcher to be \$5–\$10.5 million—several times that of the most expensive U.S.

cruise missiles if their launch platform is not included, but far less than the cost of interceptors to defeat it.⁸³

Other Chinese authors have addressed the cost-effectiveness issue only in passing. One analyst insists that cost-effectiveness should not be understood along conventional lines in such conflict scenarios and that if the technology is indeed feasible, the cost issue will not necessarily be so salient.⁸⁴ The discussion is often interwoven with analyses of which weapons can best target aircraft carriers. Here, the primary comparison is between ASBMs and cruise missiles. One analyst states that “ballistic missiles, given the same tactical parameters, offer more outstanding penetration capability and cost-effectiveness than cruise missiles,” both of which are superior to aircraft in this regard.⁸⁵ This assessment is augmented by another observer, who states that “supersonic antiship guided missiles that use ramjet engines are not very useful due to their restricted ranges.” Moreover, “it will be very difficult to surpass or even catch up to the United States and Russia in developing cruise missiles. Thus, it will be very difficult for our cruise missiles to become a deadly weapon to carry out fatal attacks against aircraft carrier formations.”⁸⁶ Chinese planners may therefore favor development of ASBMs as a means of “poor man’s sea denial,” over such complex, expensive approaches as a fleet of aircraft carriers and accompanying long-range aircraft.⁸⁷

A Coercive Quarantine?

Synthesizing the considerations above, it is possible that to the extent that tactical ballistic missiles are employed as antiship weapons, they would most likely be used as part of a multiservice combined-arms operation, as an added component of a saturation attack to overwhelm the carrier’s defensive systems. For this purpose, targeting precision would not be as important, and the more general Chinese tradition of numbers over accuracy could be employed to good effect. While coordinating such an attack would be complex and difficult, there could be significant benefits if such issues could be surmounted. If a carrier detected an incoming ballistic missile, it would likely engage it with its air-defense assets regardless of the attacking missile’s presumed accuracy. This could divert carrier defense systems from other threats, such as other ASBMs or simultaneous cruise missile volleys, and perhaps exhaust scarce interceptors. To escape this problem, carriers may opt to stay out of the range of the TBMs. As one analyst writing in the *Kanwa Asian Defense Review* puts it, “For the Chinese military forces, the practical significance of striking the aircraft carrier lies in that the attacks can play the role of ‘coercive [quarantine]’ even if the missiles cannot [always] accurately hit the targets, that is, to keep the U.S. aircraft carrier battle groups out of the Taiwan Strait combat theater.”⁸⁸

Messages for the U.S. Military?

How and to what extent might Beijing be seeking to influence strategic communications regarding ASBMs? Information manipulation should certainly be expected; discussion is likely regulated to send a desired signal. This is in keeping with the attention to deception and perception management outlined in a variety of PLA publications, including *Science of Second Artillery Campaigns*.⁸⁹ Within such a conception, different explanations for Chinese writings on ASBMs are possible; to the extent that they are manipulated, they could represent, respectively, a highly cost-effective partial deterrent until the capability is fully realized, a reflection of ongoing ambivalence and debate, a targeted effort to obscure actual capabilities, or a statement of conditional intent.

Strategic articles might well be manipulated to obscure or divert attention from an extant capability or one in rapid development. Consider the sheer volume of highly specific Chinese technical writings from a wide variety of important civilian and military institutes over the past decade—seemingly on all areas of direct relevance to ASBM development and even use—virtually all of them stating that various component capabilities are either under development or at least technically feasible. Manipulating a few strategic articles in journals known to be read outside China, by comparison, might be a particularly effective instrument in an information campaign. It is even possible that there is an effort to send a measured signal—that China may be preparing certain capabilities but has not yet made definitive plans for their deployment, the actual realization of which will be calibrated in response to American strategic actions (e.g., vis-à-vis Taiwan).

In any case, should its capabilities be developed sufficiently, Beijing might emulate former Second Artillery deputy commander Lieutenant General Zhao Xijun's logic and reveal a dramatic weapon test to the world—with or without advance warning—in some way geared to influencing official and public opinion in the United States, Taiwan, and Japan. Such an unprecedented public demonstration could be used to signal either growing Chinese power during a time of stability or Beijing's resolve in a time of diplomatic tension or crisis.⁹⁰ Alternatively, unpublicized flight tests could be conducted to deter foreign militaries without alarming foreign publics (though classified information might ultimately be leaked to them).

In any case, some sort of flight tests would be necessary to generate Chinese confidence in ASBM capabilities. The fact of a hit, however manipulated and revealed, could change the strategic equation—much as the efficacy of the 20–21 July 1921 test-bombing of the battleship *Ostfriesland* was hotly contested by the U.S. Navy (and remains debated to this day) yet altered service budgets immediately and helped catalyze development of what later became the U.S. Air Force.

Is there today a Chinese equivalent of Brigadier General Billy Mitchell eager to promote such a test to further the cause of Second Artillery and China's pioneering of new ways of war?

However the Chinese internal debate on ASBM development progresses, the strategic stakes will be high; this will be a debate worth following.

IMPLICATIONS

While there is ongoing disagreement as to their feasibility and efficacy, the idea of developing antiship ballistic missiles is clearly appealing to many in China, particularly in the Second Artillery. Any successful Chinese deployment of ASBMs would likely influence PLA thinking by

- Reinforcing continental approaches to maritime security—"using the land to control the sea"
- Reinforcing centralized approaches to command
- Increasing emphasis on multiaxis saturation attacks
- Increasing confidence in China's ability to restrict U.S. Navy operations, and to control escalation.

All does not hinge on putative ASBM capability: demonstration of other antiaccess capabilities (e.g., streaming antiship cruise missile attacks) that a technologically capable nation like China is clearly capable of mastering could have substantial effect. But ASBMs pose a threat qualitatively different from that of antiship cruise missiles: the United States has not had decades to address the problem, interception is far more complex and time sensitive, and launch platforms cannot be targeted ("shooting the archer instead of the arrow") without contemplating highly escalatory strikes in mainland China.

Chinese leaders do not seek war. Rather, they want to defend what they perceive to be their nation's core territorial interests and to ensure a stable environment for domestic economic development. If they develop an ASBM, then, they would likely hope that it could prevent U.S. projection of military power in ways that were inimical to China's interests. They would thus hope to achieve deterrence without going to war. That said, America has its own national interests, including maintaining freedom of navigation, reassuring such key regional allies as Japan and South Korea, preserving peace in the Taiwan Strait, and safeguarding Taiwan's democracy. A demonstrated Chinese ASBM capability, particularly if the Chinese side failed to offer explanations and reassurances, could threaten these interests and be strategically destabilizing. This would necessitate American development and demonstration of robust countermeasures that Beijing would come to regret.⁹¹

Herein lies one more way in which Chinese open-source discussions of ASBMs are significant, and must be addressed. Chinese public intellectuals are often tasked by their government with making unofficial statements to gauge international response to potential initiatives, as was the case in December 2008 before a far more positive historic first—the PLAN’s counterpiracy deployment to the Gulf of Aden. If some Chinese are currently sending such “trial balloons” with regard to ASBM development, but U.S. interlocutors appear to be unaware, distracted, or indifferent, this will only strengthen the hand of those pushing such programs forward. Measured expression of U.S. concern, resolve, and capability, on the other hand, might influence Chinese decision-making regarding ASBM development in a more positive direction—for example, by informing and empowering the voices of government organizations with more to lose than the Second Artillery in provoking the United States—or at least slow the pace to give time for a more measured reaction. Just as American policy makers must now discuss how best to prepare for this potential capability, they should work to ensure that their Chinese counterparts have an analogous policy debate—in parallel to the ongoing debate in open sources regarding whether China should develop and deploy an ASBM, and the doctrinal and usage implications if it does. While China will ultimately keep its own counsel, like any nation, such efforts should at least ensure that any decisions in favor of ASBM development are made with full awareness of the contingent costs, risks, and consequences. To facilitate this process, two areas require particular investment of political and human capital:

- Increased research to understand the trajectory of both Chinese ASBM efforts and the attendant policy discourse⁹²
- Bilateral strategic dialogue at all levels (particularly tracks 1.5 and 2).

Responding to the unprecedented strategic challenge presented by an ASBM capability would require the American military and civilian leadership to face hard truths, and continue to develop innovative new capabilities. The United States has many options here, and it must be prepared to exercise them. The most perilous approach would be to neglect such military innovation while continuing to insist that the United States maintained its ability to keep the peace, when in fact the military capabilities that underpin that ability were diminishing, at least in a relative sense. Such a discrepancy between rhetoric and reality would erode America’s regional credibility and fuel Chinese overconfidence. The prospect of documenting that discrepancy publicly might motivate China to conduct a demonstration of an ASBM; a successful test could create the impression that American power-projection capabilities—and the regional credibility that depends on them—had been dramatically diminished. Managing the proper response to this potential

“game changer” will demand close scrutiny from scholars, analysts, and policy makers alike, as it will critically influence America’s place in the Pacific for decades to come.

NOTES

The views expressed in this article are solely those of the authors and in no way represent the policies or estimates of the RAND Corporation, the U.S. Navy, or any other organization of the U.S. government. It is based only on open sources. Quotations and analyses are from Chinese authors unless otherwise indicated. The authors thank Dennis Blasko, Michael Chase, Peter Dombrowski, David Finkelstein, Joseph Gavin, Jr., Lyle Goldstein, Kristen Gunness, Craig Koerner, Carnes Lord, William Murray, Jonathan Pollack, Kevin Pollpeter, Robert Rubel, Christopher Weuve, Christopher Yeaw, and Toshi Yoshihara for their incisive comments. A brief, preliminary version of the present argument appeared as “On the Verge of a Game-Changer: A Chinese Antiship Ballistic Missile Could Alter the Rules in the Pacific and Place U.S. Navy Carrier Strike Groups in Jeopardy,” U.S. Naval Institute *Proceedings* 135, no. 3 (May 2009), pp. 26–32.

1. Office of the Secretary of Defense, *Military Power of the People’s Republic of China 2009*, Annual Report to Congress (Washington, D.C.: 2009), p. 29. The National Air and Space Intelligence Center adds in its latest report that the “CSS-5 ASBM,” while “not yet deployed,” has two stages. Based on commonly used missile nomenclature, the reentry vehicle would not be counted as one of the stages. NASIC, “Ballistic and Cruise Missile Threat,” April 2009, NASIC-1031-0985-09, p. 17.
2. U.S. Navy Dept., *Seapower Questions on the Chinese Submarine Force* (Washington, D.C.: Office of Naval Intelligence, 20 December 2006), available at www.fas.org/.
3. See, for example, Rear Adm. Eric A. McVadon, USN (Ret.), “China’s Maturing Navy,” *Naval War College Review* 59, no. 2 (Spring 2006), available at www.nwc.navy.mil/press/. For quotation, see *The People’s Liberation Army Navy: A Modern Navy with Chinese Characteristics* (Suitland, Md.: Office of Naval Intelligence, July 2009), p. 26.
4. This assumes that prelaunch targeting was good. Active radar is the most likely ASBM sensor, because it can penetrate through clouds.
5. See 邱贞玮 [Qiu Zhenwei], “中国反舰弹道导弹作战过程” [Operational Process of the Chinese Antiship Ballistic Missile] and “中国反舰弹道导弹发展研讨” [A Discussion of China’s Development of an Antiship Ballistic Missile], postings on blog.huanqiu.com/. The author, a twenty-eight-year-old with an undergraduate degree, a military affairs columnist for one of China’s popular news blogs, seems reasonably knowledgeable but lacks documented professional experience in either the military or the defense industry and is best thought of as a journalist. On Qiu’s blog, unattributed Chinese-language comments state that he is an amateur and that his postings are fraught with errors and excessively speculative. In particular, many “netizens” state that Qiu’s assumptions are based on technical hurdles that cannot be surmounted in the near future. Qiu has previously published an article very similar to the first of the two postings mentioned above: 邱贞玮, 龙海燕 [Qiu Zhenwei and Long Haiyan], “930 秒--中国反舰弹道导弹发展探讨 (作战假想)” [930 Seconds: A Discussion about the Development of Chinese Antiship Ballistic Missiles (Combat Scenario)], *现代舰船* [Modern Ships], no. 280, 01B (January 2007), pp. 27–34. These two related writings lack citations and cannot be corroborated. By contrast, Qiu’s “Discussion” posting provides extensive citations, which the present authors have examined and find reasonable. It is thus cited extensively here, while Qiu’s other two writings are not.
6. “PLAN ASBM Development,” 28 March 2009 posting on informationdissemination

- .blogspot.com/; "Report: Chinese Develop Special 'Kill Weapon' to Destroy U.S. Aircraft Carriers: Advanced Missile Poses Substantial New Threat for U.S. Navy," *U.S. Naval Institute*, 31 March 2009, www.usni.org/forthemedia/.
7. Xinhua, 14 March 1977, E1–E2, cited in John Wilson Lewis and Xue Litai, *China's Strategic Seapower: The Politics of Force Modernization in the Nuclear Age* (Stanford, Calif.: Stanford Univ. Press, 1994), p. 223.
 8. These gradually shifted from basic overviews and translations of foreign media reports to detailed program analyses and finally technical research, by identified experts in Chinese government academies, that would seem to have potential application to China's own programs. See, for example, 康家仁 [Kang Jiaren], "潘兴II精确末制导技术分析" [An Analysis of the Pershing II's Precision Terminal Guidance Technology], 导弹与航天运载技术 [Missiles and Space Vehicles], no. 12 (1991); 刘祥林, 三院35所; 高级工程师 [Liu Xianglin, Senior Engineer, Third Academy, 35th Institute], "雷达区域相关匹配技术及其在潘兴II战术地地导弹末制导上的应用" [Radar Area Correlation Matching Technology and Its Use in the Pershing II Tactical Ground-to-Ground Missile's Terminal Guidance and Control], 飞航导弹 [Winged Missiles Journal], no. 5 (1989); 王笃士, 航天部一院十三所 [Wang Dushi, Ministry of Spaceflight, First Department, 13th Institute], "潘兴II导弹制导方案的选择及其启示" [The Selection of the Pershing II Missile's Guidance and Control Plan and Its Inspiration], 战术导弹技术 [Tactical Missile Technology], no. 3 (1987); 张德雄 [Zhang Dexiong], "潘兴—2导弹第三次试飞部分成功" [The Pershing II Missile's Third Test Flight Is Partially Successful], 固体火箭技术 [Journal of Solid Rocket Technology], no. 1 (1983); 宋志勇 [Song Zhiyong], "潘兴—2导弹第一次试飞失败" [The Pershing II Missile's First Test Flight Fails], *Journal of Solid Rocket Technology*, no. 1 (1983); "为'潘兴'导弹试验的制导装置" [The Control and Guidance Installation for the "Pershing" Missile Test], *Winged Missiles Journal*, no. 2 (1976).
 9. These include the DF-15C, DF-21, and "DF-25." Qiu, "Discussion"; "Special Dispatch: 'Aces' in 'Dongfeng' Family: Miniaturization, Solidification, and Mobility," *Ta Kung Pao*, 2 October 1999, p. A11, OSC FTS19991114000862.
 10. For direct application of this concept to Chinese ASBM development, see 王伟 [Wang Wei], "战术弹道导弹对中国海洋战略体系的影响" [The Effect of Tactical Ballistic Missiles on the Maritime Strategy System of China], 舰载武器 [Shipborne Weapons], no. 84 (August 2006), pp. 12–15, reprinted as Danling Cacioppo, trans., *Naval War College Review* 61, no. 3 (Summer 2008), pp. 133–40.
 11. In July–August 1995 and March 1996, concerns about President Lee Deng-hui's furthering of measures that it associated with Taiwan independence led Beijing to order missile tests and other military exercises near the strait. In response, Washington dispatched *Nimitz* through the strait in December 1995 and the *Independence* and *Nimitz* battle groups toward the region in March 1996.
 12. The undisputable result is the many new platforms and weapons systems that began to appear in the early 2000s. Asymmetric in nature and antiaccess in focus, they clearly match Chinese strengths against weaknesses inherent in U.S. CSGs and other power-projection platforms. They are difficult to counter, in the view of the authors, because they target specific characteristics and limitations inherent in immutable physical laws and thus place the United States on the "wrong end of physics."
 13. For testimony, see "Panel II: Strategic Impact of PLA Naval Modernization," "Hearing on the Implications of China's Naval Modernization for the United States," *U.S.-China Economic and Security Review Commission*, 11 June 2009, www.uscc.gov. For research and development, see Qiu, "Discussion"; 陈海东, 余梦伦, 辛万青, 李军辉, 北京宇航系统工程设计部 [Chen Haidong, Yu Menglun, Xin Wanqing, Li Junhui, Beijing Institute of Astronautical Systems Engineering], and 曾庆湘, 北京特种机电研究所 [Zeng Qingxiang, Beijing Institute of Special Mechanical and Electronic Devices], "再入飞行器攻击慢速目标的制导方案研究" [Study for a Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets], *Missiles and Space Vehicles*, no. 6 (2000), pp. 5–9; Richard D. Fisher, Jr., "China's Missile Threat," *Wall Street Journal*, 30 December 1996.

14. 谭守林, 张大巧, 第二炮兵工程学院 [Tan Shoulin and Zhang Daqiao, Second Artillery Engineering College] and 刁国修, 中国人民解放军96311部队 [Diao Guoxiu, PLA Unit 96311, Huaihua], “弹道导弹打击航空母舰末制导有效区的确定与评估” [Determination and Evaluation of Effective Range for Terminal-Guidance Ballistic Missile(s) Attacking Aircraft Carrier(s)], 指挥控制与仿真 [Command Control and Simulation] 28, no. 4 (August 2006), p. 9.
15. Qiu Dishan, Zhang Lining, and Zhu Jiangnan, “Study of Task Process of Maritime Target Surveillance, Its Modeling Method,” *Military Operations Research and Systems Engineering* (December 2007).
16. 王辉, 田劲松, 张莉英 [Wang Hui, Tian Jinsong, and Zhang Liying], 廊坊陆军导弹学院, 廊坊 [Langfang Army Missile Institute, Langfang, Hebei], “基于飞行时间的弹道导弹火力控制” [Research on Fire Control of Ballistic Missile Based on Flight Time], 火力与指挥控制 [Fire Control and Command Control] 30, no. 2 (April 2005), pp. 85–87, 91.
17. While some of these sources are official publications of the PLAN, others are affiliated with China’s state shipbuilding industry and other non-PLA organizations.
18. Some sources also mention the DF-15.
19. U.S. Defense Dept., “DoD Background Briefing,” news transcript, 25 March 2009 available at www.defenselink.mil/.
20. 火飞, 罗世伟 [Huo Fei and Luo Shiwei], “无弓之箭--反航母弹道导弹效能及实用化评估” [Arrows without Bows: An Evaluation of the Effectiveness and Employment of Anti-Aircraft Carrier Ballistic Missiles], *Modern Ships*, no. 325 (April 2008), p. 23.
21. Qiu Zhenwei and Long Haiyan, “930 Seconds,” pp. 27–34.
22. 主持人: 海军军事学术研究所研究员 李杰 [Special Moderator: Li Jie, Researcher, Naval Military Studies Research Institute], “弹道导弹是航母的‘克星’吗? (上)” [Are Ballistic Missiles a “Silver Bullet” against Aircraft Carriers? (Part 1 of 2)], 当代海军 [Modern Navy] (February 2008), pp. 42–44, and “弹道导弹是航母的‘克星’吗? (下)” [Are Ballistic Missiles a “Silver Bullet” against Aircraft Carriers? (Part 2 of 2)], *Modern Navy* (March 2008), pp. 50–52.
23. The Second Artillery was poised to capitalize on leadership support for ASBM development and would likely control any ASBMs that China develops. In fact, it had assumed significant conventional missions for the first time around 1993, perhaps as part of an effort to grow institutionally in an area that was not limited by arms-control agreements or a civilian leadership concerned with China’s international image with regard to nuclear weapons. Notably, the service published what appears to be a conceptual feasibility study in 2003. 黄洪福 [Huang Hongfu], 第二炮兵科学技术委员会 [Scientific and Technological Committee of the Second Artillery Corps], “常规弹道导弹打击航母编队的设想” [Envisaging of Using Conventional Ballistic Missiles to Strike Aircraft Carrier Formation(s)], 科技研究 [Scientific and Technological Research] (2003) (1), pp. 6–8, cited in 李新其, 毕义明, 李红霞, 第二炮兵工程学院 [Li Xinqi, Bi Yiming, and Li Hongxia, Second Artillery Engineering College], “海上机动目标的运动预测模型及精度分析” [Movement Forecast Model and Precision Analysis on Maneuvering Targets on the Sea], *Fire Control and Command Control* 30, no. 4 (August 2005), p. 37.
24. These volumes satisfy generally accepted metrics for determining authoritativeness as developed by analysts in the Center for Naval Analyses (CNA)’s China Studies Division. *Science of Second Artillery Campaigns*, for instance, was published by the PLA Press, on a topic well within its purview, for the purpose of distribution throughout the PLA as high-level teaching material. The PLA-wide nature of the enterprise can be seen in assistance provided by the Directorate of Operations of the General Staff Department, the Department of Campaign and Tactical Studies of the Academy of Military Science, the National Defense University, the navy, the air force, and the Department of Operations of the Second Artillery Corps. The work of the editors and that of the Second Artillery Command College professors who drafted the actual chapters under their guidance had been reviewed by at least twelve “leaders and experts,” including Maj. Gen. Wu Zhenghong, director of the Campaign and Tactical Studies Department at the Academy of Military Science. The present authors are indebted to

David Finkelstein, director of CNA China Studies in Alexandria, Va., for his guidance concerning these issues.

25. Statement by the headquarters of the PLA General Staff. 于际训 [Yu Jixun], 中国人民解放军第二炮兵 [People's Liberation Army Second Artillery Corps], 第二炮兵战役学 [The Science of Second Artillery Campaigns] (Beijing: 解放军出版社 [PLA Press], 2004), p. 3. These volumes represent, respectively, the efforts of the PLA as a whole and of the Second Artillery to operationalize their roles vis-à-vis the *New Generation Operations Regulations* approved by President Jiang Zemin in 1999, which were themselves based on the *National Military Strategic Guidelines for the New Period* assigned to the PLA in 1993. These guidelines are distilled in at least six manual-like publications that are authoritative but unavailable to scholars. *Science of Campaigns* is based on "The Essentials of Joint Campaigns of the People's Liberation Army" (联合战役纲要); *Science of Second Artillery Campaigns* is based on this and on "The Essentials of Campaigns of the People's Liberation Army Second Artillery Corps" (第二炮兵战役纲要), as well as on the mission of "dual deterrence and dual operations" (双重威慑, 双重作战). The above-mentioned volumes thus offer irreplaceable insights into these critical but inaccessible PLA documents. "Interview with General Chief of Staff Fu Quanyou by Staff Reporter: 'Earnestly Implement Operation Decrees and Continue to Enhance Capacity to Win Wars,'" *Liberation Army Daily*, 25 February 1999, p. 1, OSC FTS19990318002173; David M. Finkelstein, "Thinking about the PLA's 'Revolution in Doctrinal Affairs,'" in *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, ed. James Mulvenon and David Finkelstein (Alexandria, Va.: Center for Naval Analyses, 2002), pp. 10–18; Brad Roberts, "Strategic Deterrence beyond Taiwan," in *Beyond the Strait: PLA Missions Other than Taiwan*, ed. Roy Kamphausen, David Lai, and Andrew Scobell (Carlisle, Pa.: U.S. Army War College, 2008), pp. 174–77.
26. 战役学 [The Science of Campaigns] (Beijing: National Defense Univ. Press, May 2006), "Chapter 31: Introduction," pp. 616–28, and "Chapter 32: The Second Artillery Conventional Missile Assault Campaign," pp. 629–36.
27. Lt. Gen. Yu Jixun is a Second Artillery deputy commander and currently serves as the service's chief of staff. Maj. Gen. Li Tilin is commandant of the Second Artillery Command College. This is clearly not their personal opinions but rather the collective institutional viewpoint of the Second Artillery; "PLA Second Artillery," not their names, appears on the book's front cover and spine. The book thus represents the best theoretical work by the PLA's best thinkers on this subject. It suggests that the Second Artillery is thinking seriously about ways to use ASBMs against U.S. CSGs, at least at the conceptual level, and that, consequently, related research and development has high-level approval from China's military and civilian leadership (at least in a general sense).
28. Yu Jixun, *Science of Second Artillery Campaigns*, p. 395.
29. Ibid., pp. 140, 320–21, for "execute focused naval blockades," and 140, 317–18, for "achieve command of the seas."
30. Ibid., p. 141.
31. Ibid., p. 392.
32. Ibid., p. 191.
33. Ibid., p. 160.
34. Ibid., p. 218.
35. Ibid.
36. Ibid., pp. 218–19.
37. Ibid., p. 401.
38. Ibid., pp. 401–402. For an unidentified warhead diagram from a Chinese Internet site, with an "电磁脉冲/电磁干扰防护层 electromagnetic pulse/electromagnetic jamming protection layer," see www.wforum.com/.
39. "When the enemy aircraft carrier battle group enters one's territorial waters, stern warnings, such as the willingness to employ conventional missile weapons to implement fire strike(s) against important targets so as to maintain national unity and defend sovereign territorial waters, can be issued to the enemy through diplomacy, broadcasting, television news, and other paths, so as to contain and deter the enemy's actions." Zhao Xijun, ed., 慑战--导弹威慑纵横谈

- [Intimidation Warfare: A Comprehensive Discussion on Missile Deterrence] (Beijing: National Defense Univ. Press, May 2005), p. 188.
40. Ibid., pp. 190–91. For very similar wording, see Yu Jixun, *Science of Second Artillery Campaigns*, pp. 292–93.
 41. Yu Jixun, *Science of Second Artillery Campaigns*, p. 293.
 42. 靖志远, 中央军委委员, 第二炮兵司令员; 彭小枫 第二炮兵政治委员 [Gen. Jing Zhiyuan, Central Military Commission member and Commander; Peng Xiaofeng, Political Commissar; Second Artillery Corps], “建设中国特色的战略导弹部队” [Building a Strategic Missile Force with Chinese Characteristics], 求实 [Seeking Truth], no. 3 (February 2009), available at www.qsjournal.com.cn/.
 43. 吴超, 龚翠玲, 宋万杰, 吴顺君; 西安电子科技大学雷达型号处理国家重点实验室 [Wu Chao, Gong Cuiling, Song Wanjie, and Wu Shunjun; National Laboratory of Signal Processing, Xi'an Electronic Technology University], “船舶目标实时一维距离像研究” [A Study of the Real-Time Range Profile of Maritime Targets], 现代雷达 [Modern Radar] 30, no. 7 (July 2008), pp. 56–59.
 44. 王隼, 杨劲松, 黄韦良, 王贺, 陈鹏 [Wang Juan, Yang Jinsong, Huang Weigen, Wang He, and Chen Peng], 卫星海洋环境动力学国家重点实验室, 国家海洋局, 第二海洋研究所, 杭州 [State Key Laboratory of Satellite Ocean Environmental Dynamics, Second Institute of Oceanography, State Oceanic Administration, Hangzhou], “多视处理对SAR船只探测的影响” [The Impact of Multi-look Processing on Synthetic-Aperture-Radar Ship Detection], 遥感学报 [Journal of Remote Sensing] 12, no. 13 (May 2008), pp. 399–404.
 45. 张宇, 张永刚, 王华, 张旭 [Zhang Yu, Zhang Yonggang, Wang Hua, and Zhang Xu], 海军大连舰艇学院 军事海洋系 [Department of Military Oceanography, Dalian Naval Academy], “两类水体中船舶含气泡尾迹海水表面光学特性的测量与分析” [Measurement and Analysis of Seawater Apparent Optical Properties of Ship Wakes with Bubbles in Case-II Waters], *Journal of Remote Sensing* 12, no. 1 (January 2008), pp. 15–22.
 46. 张宏, 祁载康, 刘雄飞, 北京理工大学宇航科学技术学院 [Zhang Hong, Qi Zaikang, and Liu Xiongfei, Beijing Institute of Technology, School of Aerospace Science and Engineering], and 苗建松, 驻247厂军事代表室 [Miao Jiansong, Military Representative Office, Factory 247, Taiyuan], “战术弹道导弹打击航母的末制导精度研究” [Research on Terminal Guidance Precision of Tactical Ballistic Missile(s) Attacking Aircraft Carrier(s)], 弹箭与制导学报 [Journal of Projectiles, Rockets, Missiles and Guidance] 28, no. 5 (2008), pp. 1–4.
 47. Li Xinqi, Bi Yiming, and Li Hongxia, “Movement Forecast Model and Precision Analysis on Maneuvering Targets on the Sea,” pp. 35–37.
 48. Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, “Determination and Evaluation of Effective Range for Terminal-Guidance Ballistic Missile(s) Attacking Aircraft Carrier(s),” pp. 6–9.
 49. Ibid., pp. 1–5.
 50. 谭守林, 李新其, 唐保国 [Tan Shoulin, Li Xinqi, and Tang Baoguo], “组合建模的航母战斗群威胁预警方法” [Threat Precaution Simulation of the Carrier Fighting Group on the Sea Based on the Combination Model-Building Method], *Command Control and Simulation* 32, no. 3 (March 2007), pp. 37–40.
 51. 李新其, 王明海, 第二炮兵工程学院作战保障系 [Li Xinqi and Wang Minghai, Operations Safeguard Department, Second Artillery Command College], “弹道导弹对大型水面舰艇的毁伤评估模型” [An Evaluation Model of Damage to Large Surface Vessels by Ballistic Missiles], 电光与控制 [Electronic Optics and Control] 15, no. 1 (January 2008), pp. 51–55.
 52. 李新其, 卢江仁 [Li Xinqi and Lu Jiangren], 第二炮兵工程学院 [Second Artillery Engineering College], “系统目标毁伤效果指标建模方法探讨” [Study on Modeling of Damage Effect Index of System Target(s)], *Command Control and Simulation* 29, no. 5 (October 2007).
 53. William S. Murray, “Revisiting Taiwan's Defense Strategy,” *Naval War College Review* 61, no. 3 (Summer 2008), pp. 13–38. See also David A. Shlapak et al., *A Question of Balance: Political Context and Military Aspects of the China-Taiwan Dispute* (Santa Monica, Calif.: RAND, 2009), pp. 31–51.

54. 曹西征, 郭立红, 杨丽梅, 中国科学院长春光学精密机械与物理研究所; 吉林长春130033中国科学院研究生院; 北京100039; 吉林长春130033 [Cao Xizheng, 1, 2; Guo Lihong, 1; Yang Limei, 1, 2; 1. Changchun Institute of Optics, Fine Mechanics and Physics, the Chinese Academy of Sciences, Changchun; 2. Graduate School of the Chinese Academy of Sciences], “战术弹道导弹再入段红外辐射特性分析” [Infrared Radiation Characteristics Analysis of Tactical Ballistic Missiles during Reentry], 光电工程 [Opto-electronic Engineering] 33, no. 9 (September 2006), pp. 23–26.
55. 唐健, 张合新 [Tang Jian and Zhang Hexin], 第二炮兵工程学院 [Second Artillery Engineering College], “变质心弹道导弹攻击航母分析” [Analysis of Attacking an Aircraft Carrier with a Moving Mass Center Surface-to-Surface Missile], *Command Control and Simulation* 29, no. 5 (October 2007).
56. Gregory Kulacki and Jeffrey G. Lewis, “Understanding China’s Antisatellite Test,” *Nonproliferation Review* 15, no. 2 (2008), pp. 335–47.
57. They are published by a relatively small group of individuals in versions with substantially overlapping content in different journals, when one might instead expect to see work from different individuals working on different components of a large project. Even if this does not constitute an attempt to influence foreigners, it might still reflect championing of programs that could be expected to benefit the Second Artillery, as well as jockeying for publicity among researchers.
58. The latter would require the rapid, seamless transmission of information among the relevant organizational entities, each operating on the basis of a mutually recognized jurisdictional and procedural authority. The number of authorities in the decision-making loop would likely have implications for how rapidly an ASBM could be launched after a relevant target was detected.
59. Wang Wei, “Effect of Tactical Ballistic Missiles,” p. 135.
60. Ge Xinliu, Mao Guanghong, and Yu Bo, “信息战中导弹部队面临的问题与对策” [Problems Faced by Guided Missile Forces in Information Warfare Conditions and Their Countermeasures], in Military Science Editorial Group, 我军信息战问题研究 [Research Questions about Information Warfare in the PLA] (Beijing: National Defense Univ. Press, 1999), pp. 188–89, cited in Larry Wortzel, “PLA Command, Control, and Targeting Architectures: Theory, Doctrine, and Warfighting Applications,” in *Right-Sizing the People’s Liberation Army: Exploring the Contours of China’s Military*, ed. Roy Kamphausen and Andrew Scobell (Carlisle, Pa.: U.S. Army War College, 2007), p. 211.
61. 赵建东, 赵英俊 [Zhao Jiandong and Zhao Yingjun, Missile Science Institute, Air Force Engineering Academy], “21世纪防空的关键--反导” [The Key to Air Defense in the 21st Century: Antimissile], *Winged Missiles Journal* (June 2007), pp. 12–16.
62. Wang Wei, “Effect of Tactical Ballistic Missiles,” p. 135.
63. Ibid.
64. Huo Fei and Luo Shiwei, “Arrows without Bows,” p. 28.
65. Ge Xinliu, Mao Guanghong, and Yu Bo, “Problems Faced by Guided Missile Forces,” cited in Wortzel, “PLA Command, Control, and Targeting Architectures,” p. 210.
66. Qiu Zhenwei and a coauthor state that by 2010 the Second Artillery Corps will control one ASBM brigade, armed with DF-21E ASBMs. In Qiu’s scenario, the PLA tracks three approaching U.S. CSGs with synthetic-aperture-radar/optical reconnaissance satellites, 2,500–3,500-kilometer sky-wave OTH radar, and “land listening stations.” U.S. attempts at interference only improve targeting. PLA forces obtain the carrier’s position from “radio signals transmitted when communicating via [Link 16]” and confirm it from “signals emitted by the air search radar, air control radar, and aircraft approach guidance radar.” DF-21E ASBMs are launched in two wave attacks with “a special incendiary agent and additive, as well as the dispersal of gas in the sky above” to reduce the initial infrared signature. A “third-stage rocket engine” gives the ASBMs a depressed trajectory, “with multiple peaks” and “increasingly violent maneuvers,” that is “extended by 300 km and dropped by 10 km.” To compensate for the fact that the homing “antenna window”

- remains open, the warheads are further concealed by a cooled shroud, balloon decoys, and symmetrical spinning, thereby defeating SM-3 interceptors. To eliminate inaccuracy of 15–42 km on a 1,100 km flight using aerodynamic flight forces to extend range, “high-altitude homing” is conducted through “radio command amendments” from satellites (including ones recently launched to support military operations), “unmanned reconnaissance aircraft,” multimode “microwave radiometers,” and sky-wave/passive radar. This is followed by “terminal infrared image homing,” during which the warheads adopt an “unpredictable swinging trajectory,” thereby “easily evading air defense missiles.” Twelve and a half minutes after launch, the first four DF-21E ASBMs strike the targeted CSG destroyers, either “sinking the ships or inflicting severe damage to their ammunition warehouses and engine rooms.” Three minutes later, a second salvo strikes the three aircraft carriers. The author maintains that “a conservative set of ASBM data has been used for this scenario; for example, the hypothetical [radar cross section] of the warhead was 0.001 square meters, the warheads did not electronically jam the data link of the radar or intercept missile . . . [or] the GPS navigation of the intercept missile, many missiles were not launched simultaneously to create confusion, and antiship missiles did not attack the destroyers that had given up their air defense capabilities.” While stating that “in the foreseeable future, there will be many ways to shoot down antiship ballistic missiles that use countermeasures,” due to advances in missile tracking capabilities and interceptors, the author cites many “weaknesses of the U.S. military’s entire system” and concludes that “at the very minimum, the aggressor will hold the advantage prior to 2020.” Qiu Zhenwei and Long Haiyan, “930 Seconds,” pp. 27–34. Further details are provided by the same author, in one of the recent Internet postings mentioned at the beginning of this article. Qiu, “Operational Process.”
67. Wang Wei, “Effect of Tactical Ballistic Missiles,” pp. 133–40.
 68. Huo Fei and Luo Shiwei, “Arrows without Bows,” p. 27.
 69. Quoted in *ibid.*
 70. *Ibid.*, p. 28.
 71. *Ibid.*, pp. 27–28.
 72. *Ibid.*, p. 28.
 73. “震撼战场的‘抛物线攻击’--战术弹道导弹在实战中德表现” [The “Parabolic Attack” of the Shock Battlefield], 现代兵器 [Modern Weapons] (May 2001), pp. 38–40.
 74. Moreover, given the likely duration of an ASBM engagement, an ASBM might not even need to “track” in a strict sense of the term, depending on the scale of search parameters. If it were known that a carrier were within a given area, and the seeker window were larger than the conceivable distance the carrier could travel in the time between detection of its position and ASBM launch, real-time target tracking prelaunch and data relay thereafter might not be so important. This could simplify things immensely; the seeker could cover everything via terminal homing. For (micro)satellites, see Qiu, “Discussion.”
 75. Sean O’Connor, “OTH Radar and the ASBM Threat,” 11 November 2008 posting on geimint.blogspot.com/. OTH radar also plays a major role in the scenario developed in Qiu Zhenwei and Long Haiyan, “930 Seconds,” pp. 27–34. See also Qiu, “Discussion.”
 76. Li Jie, “Are Ballistic Missiles a ‘Silver Bullet’ against Aircraft Carriers? (Part 2 of 2),” p. 52.
 77. See Qiu, “Operational Process” and “Discussion”; Qiu Zhenwei and Long Haiyan, “930 Seconds,” pp. 27–34.
 78. 李新其, 牛国华, 王明海, 第二炮兵工程学院 作战保障系 [Li Xinqi, Niu Guohua, Wang Minghai, Department of Operational Support, Second Artillery Engineering College], and 骆明君, 四川成都海军代表室 [Luo Mingjun, Navy Representative at Chengdu], “子母弹对航空母舰舰载机群毁伤计算的像素仿真法” [Pixel-Simulation Study on the Damage Efficiency of Attacking Carrier-Based Aircraft Groups with Submunitions], 系统仿真学报 [Journal of System Simulation] 20, no. 11 (August 2008), pp. 3062–64.
 79. Huo Fei and Luo Shiwei, “Arrows without Bows,” pp. 23–25.
 80. See, for example, Li Xinqi et al., “Pixel-Simulation Study,” pp. 3062–64.

81. Thomas G. Mahnken, *The Cruise Missile Challenge* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2005), p. 42.
82. The original Chinese equivalent of the English quotation cited in text is “当采用弹道导弹实施攻顶作战时, 其突防概率可达0.95.” See 许诚, 李永胜, 孙锦 [Xu Cheng, Li Yongsheng, and Sun Jin], 海军航空工程学院204教研室, 山东烟台 [Teaching and Research Section 204, Naval Aeronautical Engineering Institute, Yantai], “基于MARKOV过程的反舰导弹突防舰艇编队能力评估” [An Evaluation of the Ability of Anti-ship Missiles to Penetrate Naval Vessel Formations Based on Markov Queueing Theory], 飞行力学 [Flight Dynamics] 27, no. 2 (April 2009), p. 95. A cruise missile approaches its target from a low, head-on position (whereas a ballistic missile approaches from overhead). Its target is thus set against an air background, facilitating detection. But lack of an overhead view of the target complicates target classification.
83. For cost estimate, see Qiu and Long, cited in, but not the authors of, the online-journal posting “China’s Anti-ship Ballistic Missile Program: Checkmate for Taiwan?” *Taiwan Link*, 17 June 2009, www.thetaiwanlink.blogspot.com/. Maritime surveillance is useful for all attack platforms, so there might be a broad-based rationale for overall improvements that would support ASBM operations.
84. Wang Wei, “Effect of Tactical Ballistic Missiles,” pp. 133–40.
85. Ibid.
86. Wang Zaigang, “Nemeses of Aircraft Carriers,” 舰船知识 [Naval and Merchant Ships] (February 2005).
87. For Western research on this subject, see Bernard Fox, Michael Boito, John C. Graser, and Obaid Younossi, *Test and Evaluation Trends and Costs for Aircraft and Guided Weapons* (Arlington, Va.: RAND, 2004).
88. Jeff Chen, “How Will PLA Second Artillery Force Strike Aircraft Carrier?” *Kanwa Asian Defense Review*, no. 36 (October 2007).
89. Yu Jixun, *Science of Second Artillery Campaigns*, pp. 281, 288.
90. Precisely such a course of action is suggested in *Science of Second Artillery Campaigns*, as part of “Campaign Deterrence Methods”: “Pressure of public opinion is exerted primarily through the following methods. First, issue news and announcements about new types of missile weaponry. Second, release pictures of the situations in missile force exercise to the foreign media. Third, issue stern warnings to the enemy that we will carry out missile strikes. In accordance with the needs of missile force campaign deterrence, one can adopt the forms of television news and announcements, the Internet, and one can hold press conferences. At suitable times, one can release information about new types of missiles. . . . When a strong enemy’s carrier strike group invades our maritime territory and when it directly uses military force to engage in a military intervention, we can communicate to the enemy, through the use of diplomatic, broadcast, television news, and other channels, that the use of conventional missile weaponry in fire strikes against the enemy’s nuclear aircraft carrier will not be removed from possibility.” Ibid., p. 283. While a full-up test would be preferable to generate confidence in the system’s performance, considerable progress could be made short of such an action. As one expert notes, China could “conduct separate tests for the guidance package, flight vehicle, and attitude control system. Chinese references note [the] possibility of using hardware in the loop or other simulation to test an ASBM guidance system.” See “Checkmate for Taiwan?”
91. For further areas of concern, see Andrew Erickson, “Facing a New Missile Threat from China (Op-Ed): How the U.S. Should Respond to China’s Development of Anti-ship Ballistic Missile Systems,” *CBS News*, 28 May 2009, www.cbsnews.com/.
92. For preliminary research in this area, see Andrew Erickson, “Chinese ASBM Development: Knowns and Unknowns,” *Jamestown China Brief*, 24 June 2009, pp. 4–8, www.jamestown.org/.

CHINA'S ANTISHIP BALLISTIC MISSILE

Developments and Missing Links

Eric Hagt and Matthew Durnin

China's pursuit of an antiship ballistic missile (ASBM) has been called a potential "game changer," a weapon that could single-handedly shift the strategic balance with the United States. A retired U.S. Navy rear admiral asserted as early as 2005 that an ASBM capability could represent "the strategic equivalent of China's acquiring nuclear weapons in 1964."¹ Whether or not this is accurate, an effective ASBM capability would undoubtedly constitute a formidable anti-access weapon against the U.S. Navy in the western Pacific, particularly during a conflict over Taiwan.² However, as the Chinese literature demonstrates, it would mean more than that. Fully operational ASBM capability along with essential C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) support would be a barometer of China's greater military modernization effort, a potential instrument for regional strategic ambitions, and perhaps an important element in tipping the long-term maritime strategic balance with respect to the United States.

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Given China's overall inferiority in long-range air and naval power, an ASBM would afford a powerful asymmetric means that could help deter the U.S. forces on their way to a zone of conflict near China's littoral borders. However, the ASBM represents more than just a single weapon platform. Rather, it is seen as "a system of systems" and a key step in achieving high-tech and information war capabilities.³ This is because the ability to launch a land-based ballistic missile at a moving target thousands of kilometers

away requires a wide range of support and information technologies far beyond just the missile itself. Certainly, the medium-range ballistic missile (MRBM) is the core component of this system, and the technological demands in maneuvering, guidance, and homing to defeat defenses and find its moving target at sea are formidable. However, an effective ASBM would also require the ability to detect, identify, and track the target using some combination of land, sea, air, and space-based surveillance assets. Aside from the immediate software and hardware, all of these functions would have to be highly integrated, fast reacting, and sufficiently flexible to attack the world's most sophisticated and best defended naval target in the world today—a U.S. aircraft carrier strike group (CSG).

China's interest in ASBM capability seems logical on the basis of its perceptions of its strategic environment and as a natural outgrowth of its robust missile program. Yet at what stage is its development? While Andrew Erickson and David Yang (earlier in this issue) survey the Chinese literature regarding the strategic, policy, and doctrinal dimensions of the ASBM system, this article examines the development of several key components of the system and their operational readiness. It does so on the basis of the literature, supported by qualitative modeling where direct discussions of the system are particularly lacking, such as for space-based targeting.⁴ Finally, the article addresses some of the implications for the U.S. Navy and the naval strategic balance between the United States and China.

The People's Liberation Army (PLA) rarely discusses openly the development of major new weapon systems, but the ASBM appears to be an exception. In an annual academic conference sponsored by the Second Artillery Engineering College, the proceedings clearly state that "in order to pierce the armor of a carrier . . . China is developing a new boost-glide ballistic missile . . . equipped with terminal guidance systems."⁵ This startlingly direct admission reveals the level of commitment to the program within the military branch primarily developing it. However, the building of such a system should not come as a surprise. As Erickson and Yang make clear, China's military appears keenly interested in an ASBM capability, for a variety of reasons. Most important, the antiship ballistic missile comports with China's perception of its security environment and its strategic vulnerabilities vis-à-vis the U.S. military. An ASBM could afford China a formidable asymmetric weapon against the United States in the western Pacific and would be particularly relevant to a conflict over Taiwan. Moreover, an ASBM program is a feasible application for China's mature and sophisticated ballistic and cruise missile technological developments.

THE KILL CHAIN

While the concept of an ASBM system is evident at high-level discussions in the military, the ability to operationalize what is described as “a system of systems” involves a series of capabilities that go far beyond just the core missile components.⁶ A complete ASBM system will require the ability to detect, identify, track, target, and engage a threat and then perform damage assessment upon it—the “kill chain.”⁷ Each of these sensor-to-shooter steps must be executed in a time-sensitive manner, since the intended target would be maneuverable—a U.S. aircraft carrier (or carrier strike group, comprising the carrier, its escorts, other missile-carrying ships, and support and other vessels assigned to its embarked commander). A complete kill chain entails a wide range of technologies, from penetration aids on board the missile, space-based and other sensors, data processing and exchange networks, and other infrastructure to achieve a high degree of integration of both the weapon platform and its command and control.⁸

The relevant literature stresses three technical challenges that would have to be resolved if China is to achieve an effective and reliable ASBM capability: first, ensuring that an ASBM can defeat American missile defenses; second, equipping a ballistic-missile weapon system to track and hit a moving target in its terminal phase; and last, providing accurate, real-time geolocation tracking and targeting data—particularly using space-based assets—to the missile system prior to launch.

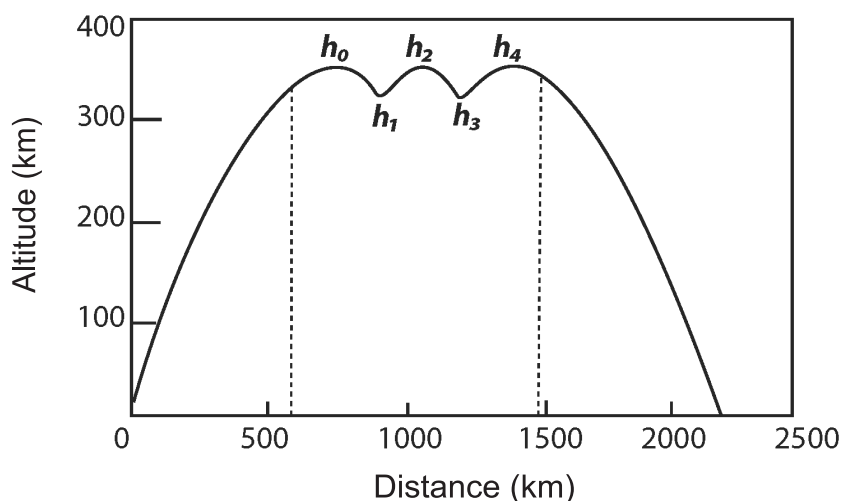
The Missile's Mission

There is little doubt that a variant of the Dong Feng 21 (DF-21) missile is the candidate for the ASBM.⁹ Moreover, much of the work to adapt the DF-21 for such a mission appears to have been developed in the late 1990s, such as an ablative shield against aerodynamic heating during reentry, vibration resistance, and optimization of the payload.¹⁰ There is also discussion of adding a third stage to the missile, not only to increase its range but to provide extra maneuverability in midcourse flight (discussed below).¹¹ The third stage appears to be in development, although several documents suggest that the missile and its maneuvering capabilities remain in the early research and experimental stages.¹²

Chinese sources go into detail about various methods of maneuvering during a ballistic missile's midcourse phase.¹³ Maneuvering increases the missile's terminal target-seeking coverage so as to hit a moving target at sea. However, the impact of U.S. missile defenses—primarily the sea-based Aegis system equipped with SM-3, Terminal High-Altitude Area Defense (THAAD), and the Kinetic Energy Interceptor—on the missile's survivability is also discussed.¹⁴ A number of measures are suggested to defeat them. Altering the missile's flight path by employing a wavelike trajectory rather than a traditional parabolic flight path is

one method.¹⁵ In this scenario, the additional third stage of the DF-21 missile, with its hybrid liquid-solid fuel booster, is ignited several times to effect several wave patterns in the missile's midcourse flight (see figure 1). Other methods include weaving, spiraling, spinning, and gliding—all of which would alter the traditional parabolic flight path of the ballistic missile and boost the missile's penetration capabilities against American missile defenses, which depend heavily on prediction of a missile's flight trajectory.¹⁶

FIGURE 1
WAVE TRAJECTORY



Source: Gu Liangxian, Gong Chunlin, and Wu Wuhua, "Design and Optimization of Wavy Trajectory for Ballistic Missiles."

Controlled maneuvering in space should not be a "bottleneck technology," according to one source, since China has already demonstrated real progress in "orbital maneuvering and docking" under the Shenzhou program.¹⁷ However, other publications suggest that research and experiments involving wave and gliding trajectories began only in 2003, *de novo*, and there is no evidence that China has made breakthroughs in this area.¹⁸ Moreover, the academic treatments of these exo-atmospheric maneuvers appear to be largely theoretical in nature.¹⁹ For instance, they do not systematically address the problem of how to "maintain guidance [for the target] during the whole trajectory," which other articles insist is a technical challenge China must overcome.²⁰ In fact, the technical discussion does not directly connect midcourse maneuvering with the ASBM system, as several general analyses do, suggesting that such linkage is only conceptual. Also, the omission of alternative, traditional countermeasures and decoys seems impractical;²¹ a number of prominent American specialists believe that China would likely be able to defeat midcourse interceptors using

relatively low-tech means.²² The simplest countermeasure of all may be simply to launch a salvo of missiles; U.S. missile defenses would not likely be able to destroy them all.²³

China has already demonstrated many of the core technologies required for such a system. While adapting off-the-shelf technologies to an ASBM system is both logical progression and feasible, the literature appears ambiguous as to their application to a new environment (penetrating missile defenses) and an evolved mission (hitting a moving target at sea).

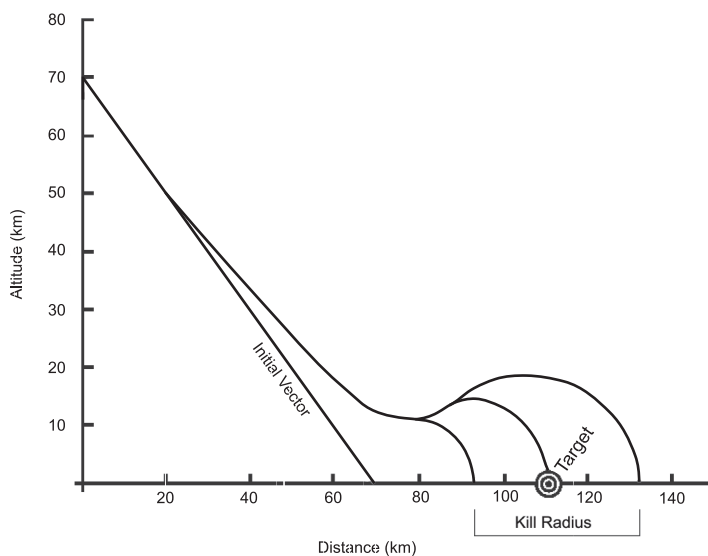
Terminal Guidance and Homing

A second area that has received substantial attention in the technical literature is the demand for reentry and terminal guidance of the warhead. Opinions on this point appear to vary considerably more than with other aspects of the system. Some observers are cautious about such a program, seeing the significant technical hurdles inherent in a complex ASBM system. A key issue according to most analyses is the speed of the warhead. Reentry into the atmosphere at high speed (2.2–5 km/sec) would produce a plasma shield, making homing by radar and infrared difficult.²⁴ However, “to control the missile’s speed in order to switch from midstage guidance [inertial] to terminal stage guidance [homing] will require an overload that will be difficult to achieve.”²⁵ Aside from the difficulties of controlling the missile’s velocity, a lower terminal speed would make the warhead more vulnerable to missile defenses.²⁶ Others fear that the range of maneuverability of the carrier could be sufficient to evade the missile, even with active homing systems.²⁷ A number of other constraints to developing a reliable ASBM are also discussed. For instance, can the warhead attack its target at the desired angle—to pierce the carrier’s armor—given the constraints of the missile’s trajectory after reentry and the requirements of radar and infrared homing?²⁸ Also, can the missile carry sufficient antijamming capabilities?²⁹

Nonetheless, the majority of studies indicate that the technical obstacles are well within China’s ability to resolve. For example, controlling the speed of the missile after reentry is difficult but possible. A number of authors suggest a “pulling up” maneuver at an altitude of between twenty-five and fifty kilometers to level off the ballistic trajectory, positioning the warhead to search for its target.³⁰ The change in trajectory would also act as a defense-penetration aid.³¹ As for guiding the missile to its target, a number of studies argue that the speed and maneuverability of an aircraft carrier are probably too limited to evade an MRBM in the terminal phase.³² As figure 2, adapted from a Chinese study, illustrates, the “kill radius” (the distance the target could deviate from initial position and still be struck) of a terminally guided ASBM missile that has reduced its speed to allow for active homing to seek its target is approximately twenty

kilometers.³³ This assumes the missile has accurate prelaunch target coordinates (discussed later) and that the missile's flight time (also, the time the carrier has to maneuver) is limited to roughly fifteen minutes. If the system is relying on space-based targeting, this is likely an overly optimistic scenario;³⁴ however, assuming that it is possible, an aircraft carrier could not evade the missile even if traveling at thirty-five knots. Using guidance in both the midcourse (for instance, millimeter-wave radar) and terminal (radar or infrared) phases could increase the attack radius to forty kilometers, according to one study.³⁵

FIGURE 2
ASBM KILL RADIUS



Source: Chen Haidong et al., "Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets."

Another source draws the conclusion—using a different simulation—that the warhead could have a kill radius of one hundred kilometers once terminal guidance was engaged.³⁶ In a discussion in *Naval and Merchant Ships*, Dong Lu calculates the maximum distance at which the basic radar terminal guidance of a similar missile system, the retired U.S. Pershing II, could detect a carrier that had maneuvered for fifteen minutes, given a scanning height for the missile's radar of nineteen kilometers.³⁷ Terminal guidance of an ASBM would appear to be a feasible adaptation of missile systems with which China has had success (surface-to-air and air-to-air missiles, and antiship cruise missiles).³⁸ Still, a number of unique technical obstacles remain, such as the materials needed to protect sophisticated guidance systems during reentry;³⁹ the ability to function in an environment of higher speed and more severe temperature dynamics than

in earlier applications;⁴⁰ and the ability to distinguish a target at unusual angles of attack at the distances required for reentry.⁴¹

A number of publications view U.S. missile defenses as a primary concern for the ASBM in its terminal phase as well as midcourse. Some believe that the ASBM will have to slow down considerably in order to locate and maneuver to the carrier, making it a much more manageable problem for missile defenses.⁴² Others see the difficulties in fending off electronic jamming and measures against active-radar terminal seekers.

In sum, in the available literature on the ASBM that began to proliferate in the late 1990s, one can see the rough outline of a technical evolution. Discussions are now less theoretical and conceptual in nature and are instead more systematic and detailed. Earlier studies were broader in scope, addressing large portions of the kill chain, from launch to target impact.⁴³ Since then, studies have become increasingly specific, focusing on particular engineering problems, within limited ranges of analysis.⁴⁴ Further, some earlier studies laid out conceptual proposals that contained glaring technical inconsistencies; later documents have been more concerned with applications and have been underpinned by carefully scrutinized simulations.⁴⁵ Finally, in later publications one can read of specific research and testing being done on component technologies. For instance, early experiments on high-altitude gliding of the missile frame appear to have begun.⁴⁶ Likewise, testing on “active radar guided weapon systems aimed at maritime targets” has been conducted, although not “under heavy sea conditions and a small grazing angle,” as the authors admit would be necessary to an operational evaluation.⁴⁷ Notwithstanding, if these examples may illustrate a concrete progression in core components of the ASBM system, they also reveal that work on the many secondary technical issues is just beginning. In addition, it has been clearly realized that theory and even testing are not substitutes for combat experience, of which China has none in this realm.⁴⁸

Missing Links

To strike any target with an ASBM, China would have first to form an accurate idea of its recent location. In the kill-chain formulation, this would comprise detecting, identifying, tracking, targeting, and engaging the threat. The Chinese literature on this aspect of the ASBM system is generally pessimistic that the PLA has enough of the key technologies to realize such a system.

Detecting the carrier at great distances would depend on early-warning systems, such as sky-wave, over-the-horizon (OTH) radar, or electronic signals intelligence, that would give a general idea of the target’s geographic coordinates.⁴⁹ There is substantial evidence that China has at least one over-the-horizon-backscatter (OTH-B) system up and running.⁵⁰ It could be used to identify

targets at long range, although with a tracking error of from twenty to forty kilometers (substantially lower than the American OTH accuracy, roughly eight to thirty kilometers) it would be unable to perform reliable target location independently.⁵¹ An ASBM attack radius of roughly twenty kilometers, as discussed above, would correlate only to the extreme, best-possible performance of China's OTH tracking, and even then only for a stationary carrier. Long-distance early warning could also come from electronic and signal intelligence (ELINT and SIGINT), whether airborne, shipborne, or space based. China's ability to use airborne and shipborne electronic surveillance would be limited, however, since both would require a dangerously close approach to the carrier group. The open-source literature is almost completely silent on China's current on-orbit ELINT/SIGINT assets, but indirect evidence indicates that it either does have such capabilities or is actively developing them.⁵²

Once the carrier is identified, its position needs to be pinpointed. Long-range unmanned aerial vehicles (UAVs) could gather such information. China is apparently committed to investing in such a program and has several operational high- and medium-altitude long-endurance UAVs, with others planned, capable of carrying out reconnaissance far out at sea. The Xianglong, currently China's largest UAV, appears to have a combat radius of 2,000–2,500 kilometers (that is, a range of 7,500 kilometers), a mission payload of six hundred kilograms, and a maximum endurance of ten hours.⁵³ It can also carry electronic jamming pods to defend against antiradiation missiles, as well Global Positioning System jamming and antijamming capabilities. However, the Xianglong is believed still to lack sufficient high-altitude endurance for an anticarrier mission. Moreover, China still lacks C4ISR infrastructure—such as information processing, bandwidth capacity, and network support—needed for wide-area surveillance at the level of the U.S. Broad Area Maritime System.⁵⁴ Further, even a fully capable UAV could be vulnerable to a carrier group's formidable air and electronic defenses—assuming the carrier(s) and accompanying ships were not operating in electronic silence in order not to announce their approach—before it could provide targeting information; thus the UAV alone is not a reliable option.⁵⁵ Theoretically, if advanced enough, UAV capabilities would be adequate for targeting if combined with other terrestrial cueing systems, such as OTH. However, the open-source literature clearly views these capabilities as currently insufficient to deal with superior U.S. naval power.

Overall, China's current UAV capabilities and the risks involved in obtaining targeting information from surface combatant vessels or air forces near the CSG strongly suggest that the PLA would not depend solely upon these platforms to determine the exact location of the target. Others have surmised that the Chinese military could utilize such alternatives as China's growing fleet of

stealthy submarines, or even merchant fishing vessels, to supply targeting data.⁵⁶ For example, the PLA Navy submarine force, with its increasing number of quiet attack submarines, offers another conceivable alternative for tracking targets at sea. These are not optimal means, but they are immediately available and could be part of an interim capability or emergency backup. To what degree these methods would be relied on in a time of conflict is debatable;⁵⁷ a robust and reliable targeting system to support the ASBM, of which space-based reconnaissance would be a key element, appears to be a high priority.⁵⁸ Regardless, and given the widespread assumption that space-based targeting is critical, does China have enough of the right type of satellites to find a carrier and view it frequently enough to be sure of its location, and if so, can it process and transmit the data to the launch pad quickly enough?

Space-Based Targeting

The literature reveals a consensus that a space-based reconnaissance system, though critical to the effective operation of conventional missiles, remains the weakest link in China's targeting capabilities.⁵⁹ Two areas of concern are prevalent. The first involves the physical limitations of China's current space infrastructure for reconnaissance. While many Chinese satellites have sufficient imaging resolution (given the size of the target and its radar cross section, resolution demands are not high), the systemwide revisit rate is inadequate for sustained coverage.⁶⁰ Other articles show a lack of confidence in China's ability to locate moving targets using imaging satellites, arguing the need for electronic surveillance satellites to augment them.⁶¹ But the problem is more than quantity, as others argue: fitting the various components of C4ISR into a seamless network remains a huge challenge for China.⁶² This last issue involves technological system limitations, but it also entails organizational and bureaucratic barriers impeding the ability of disparate space assets to perform highly time-sensitive missions.⁶³ In short, the literature strongly indicates that space infrastructure for the ASBM targeting likely remains underdeveloped.⁶⁴

China has a maximum of twenty-two imaging space assets that could potentially assist in identifying, locating, and tracking a carrier group. Only nine of the imaging satellites in low earth orbit (LEO) are classified as military; however, given the dual-use nature of many of the civilian space assets, the possibility that other nominally nonmilitary satellites could be tasked in a time of conflict cannot be discounted. The lingering question is how well all of these space assets can be integrated, both within the military and across the civilian/military divide. Assuming the best, what time lag would occur in the processing of this imagery? While the degree of integration of China's various dual-use assets is

impossible to assess quantitatively and precisely from public sources, a number of reported characteristics demonstrate that it is certainly not seamless.

Institutional barriers are frequently identified as a potential obstacle to integrating the diverse ownership and operating arrangements of China's space assets. This could be particularly acute in applying space assets to a time-sensitive mission, such as C4ISR support for an ASBM strike on a U.S. carrier, that would require a closely coordinated space architecture.

For instance, how would the two services critical to executing an ASBM mission—the Second Artillery and the PLA Navy (PLAN)—fit into the military aerospace sector, which would provide critical support?⁶⁵ This issue is compounded by the fact that command and control over China's military space capabilities is itself not unified. Nor are the lines of authority clear between the military and China's unique and diverse civilian and government space organization, a fact that would have an impact both on the use of space assets and on the real-time exchange of data across a large, interagency information network.⁶⁶

China's satellite program is highly decentralized. The PLA unquestionably plays the most prominent role in overseeing China's dual-use space infrastructure; however, many satellites and their application are owned or operated by at

FIGURE 3
CHINESE SPACE ORGANIZATION

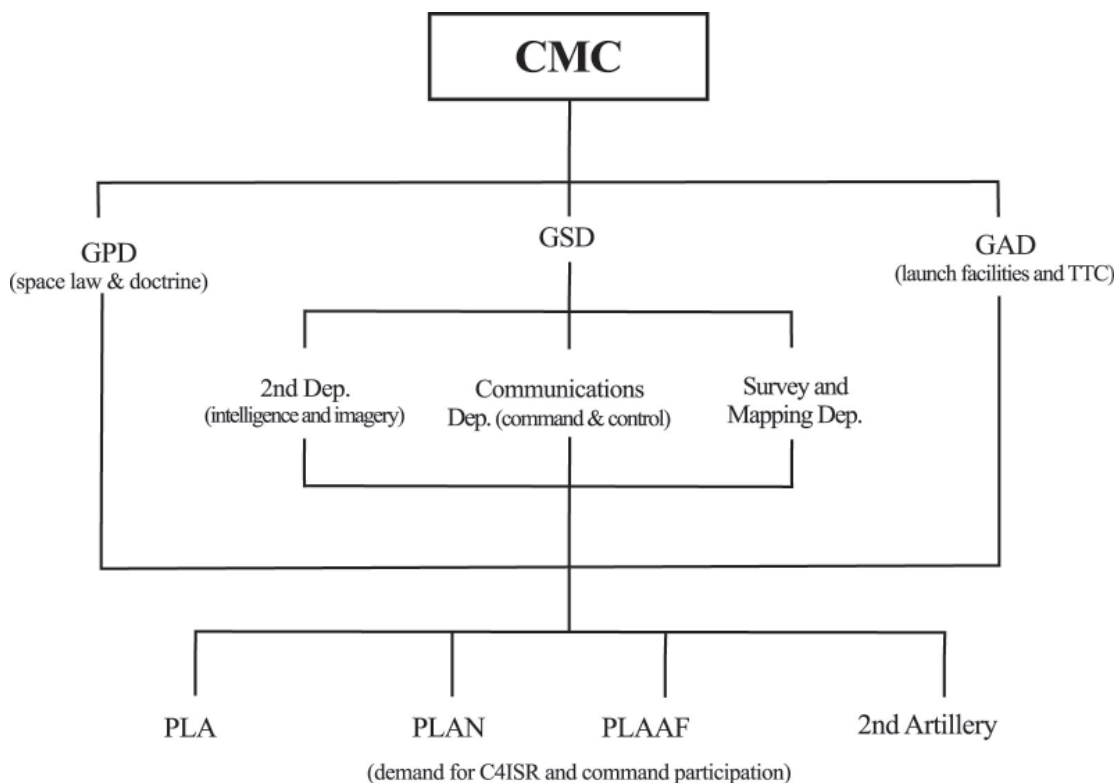
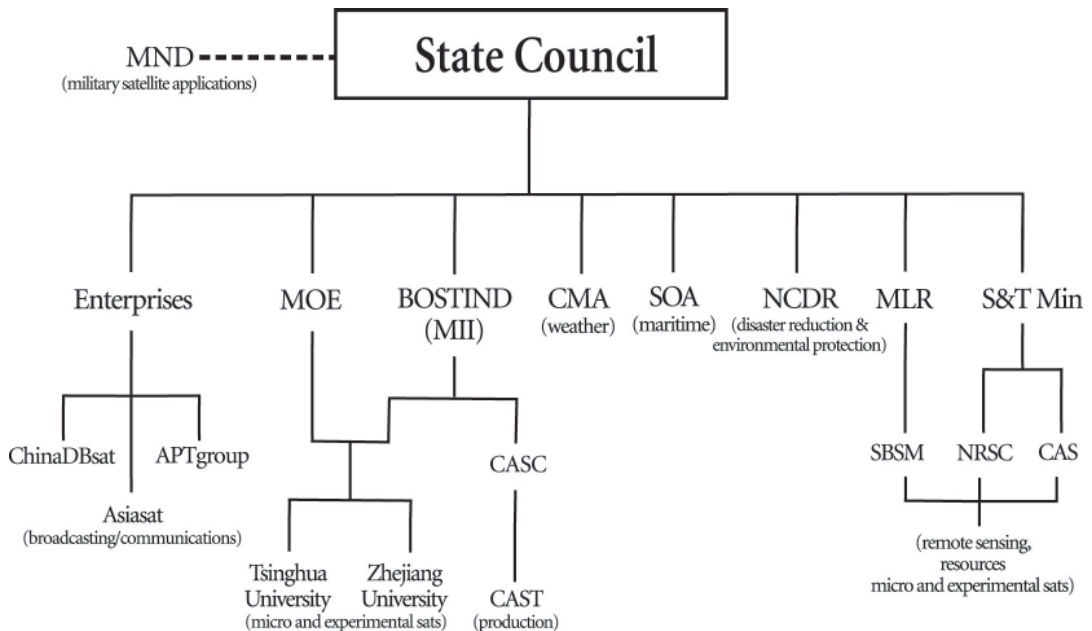


FIGURE 3 CONTINUED
CHINESE SPACE ORGANIZATION



CMC: Central Military Commission
GPD: General Politics Department
GSD: General Staff Department
GAD: General Armaments Department
PLAN: PLA Navy
PLAAF: PLA Air Force
MND: Ministry of National Defense
MOE: Ministry of Education
BOSTIND: Bureau of Science & Technology Industry for National Defense
MI: Ministry of Industry and Information

CASC: China Aeronautics Science and Technology Corporation
CAST: China Academy of Space Technology
CMA: China Meteorological Agency
SOA: State Oceanographic Agency
NCDR: National Committee for Disaster Reductions
MLR: Ministry for Land and Resources
S&T Min: Science and Technology Ministry
SBSM: State Bureau for Surveying & Mapping
NRSC: National Remote Sensing Center
CAS: China Academy of Sciences

least a dozen agencies spread across the government, universities, and the quasi-private sector—in addition to the military.

The primary authority over launch facilities and on-orbit command and control is the General Armaments Department (GAD), while the overall military operation of satellites is the purview of various departments within the General Staff Department (GSD). Furthermore, approximately 75 percent of China's space-based assets are essentially under nonmilitary entities, such as the China Meteorological Agency, the State Oceanographic Agency, and a number of state-owned enterprises. These are peacetime operators, and the transfer of authority and expertise to the PLA during a time of conflict is cited as a concern among some in the military.⁶⁷

Achieving commonality would require bridging between essentially coequal military bureaucracies (such as GAD and GSD) and different levels of military

bodies (GAD and the Second Artillery, the PLA Air Force, the PLAN, and the seven military regions), as well as between military and nonmilitary agencies (e.g., the PLAN and the State Oceanographic Agency).⁶⁸ In short, integration of the command and application of on-orbit assets would entail coordination horizontally and vertically within the military as well as across military and civilian organizations. In theory, the overall control the military has over the space program, combined with the improved and soon to be promulgated National Defense and Mobilization Law, will likely provide sufficient authority to coordinate command and control over space during a conflict.⁶⁹ Nevertheless, limiting the transaction cost in working with so many agencies could be critical in such time-sensitive demands as an ASBM combat mission. Since the military is deeply involved in the space program, lines of authority may be clearer than is apparent from open-source evidence, yet the increasingly vociferous calls for a more coherent space leadership and legal guarantees applying to time of conflict signal a lack of integration.⁷⁰ The initial confusion over organizing remote-sensing data from domestic and foreign sources during the Wenchuan earthquake is, if nothing else, testimony to the difficulties inherent in such a system.⁷¹

Moreover, the command structure remains vague within the military itself. To take an operational example, the plausible use of space for an ASBM mission would require at a minimum a highly coordinated effort between satellite space support, missile launch operators, and the navy. No independent PLA organization exists to ensure this, although several services are vying for organizational leadership of the military space program, including the air force, GAD, GSD, and the Second Artillery.⁷²

MODELING: CHINA'S SPACE ISR FOR TARGETING

Assuming that China's space assets were sufficiently integrated to support an ASBM mission during a conflict, the question remains as to whether the sum of all its satellite capabilities would be large enough to succeed. To be confident that it can launch an attack on a carrier group at a time of its choosing, China would need to update the group's location as often as possible.⁷³ Its ability to do this would depend on the orbits of its satellites and the capabilities of the sensors each carries.⁷⁴

The frequency with which an individual satellite revisits a location depends on both its orbit and the maneuverability of its sensors. In the low latitudes where a Taiwan-related conflict would occur, it could take between five and twenty-nine days for one of China's reconnaissance satellites to pass directly over the same point twice. However, by pointing its cameras or sensors sideways—that is, aiming “off nadir,” not only straight down—a satellite can image

from adjacent passes, greatly increasing the revisit rate. The modeling below uses two sets of off-nadir angles to provide both average or realistic, as well as maximum, scenarios.⁷⁵

In the task of finding a U.S. carrier at sea, China's satellites would vary in their usefulness according to sensor type and resolution. Of the sensors deployed on China's satellites, synthetic aperture radar (SAR) is the most useful for hunting maritime targets, as it can sweep a relatively wide swath at a resolution good enough to image fairly small targets.⁷⁶ SAR can produce imagery regardless of weather or sunlight. Instead of merely looking for a carrier group itself, SAR can capture ship wakes trailing over large stretches of ocean, making it particularly useful for finding moving targets. Multispectral and hyperspectral sensors can also be very effective. For instance, they could spot algae and other phosphorescent material churned up by ships. Infrared and regular visible-light images could also be useful, but they would have relatively narrow foci and could not scan vast stretches of ocean.

Like most aspects of the military space program, the exact sensor capabilities of China's satellites are closely guarded secrets. However, general sensor information is available for most satellites (see the table). According to open sources, only four of China's satellites in low earth orbit, all in the military Yaogan series, are equipped with SAR. Other satellites, nominally intended for weather monitoring, survey, or other civilian uses, could potentially be of use during a conflict. Satellites like the CBERS, Haiyang, Fengyun, and Huanjing types carry multi- and hyperspectral sensors that could be used to locate military targets.

CHINESE SATELLITE IMAGING CAPABILITIES

| Satellite | Sensor Capabilities |
|-------------------------|--|
| Ziyuan-2A | Charge-coupled device (CCD); infrared multispectral scanner; capable of generating high-quality (< 3 m resolution) |
| Jianbing-3B (Ziyuan-2B) | High-resolution CCD camera; infrared multispectral scanner |
| Jianbing-3C (Ziyuan-2C) | High-resolution CCD cameras; infrared multispectral scanner |
| Yaogan-1 | SAR (5 m resolution, high resolution: 5 × 5 m target discrimination at 40 km, low resolution: 20 m × 20 m at 100 km) |
| Yaogan-2 | Electro-optical; multispectral sensors (1 m resolution) |
| Yaogan-3 | SAR (high resolution: < 5 × 5 m) |
| Yaogan-4 | Electro-optical (0.5 m resolution) |
| Yaogan-5 | SAR |
| Yaogan-6 | SAR (estimated ground resolution of 0.6–1 m) |
| Tansuo-1 (Shiyan-1) | High-resolution electro-optical; near infrared; CCD survey cameras (10 m resolution; image swath of 120 km wide) |
| Tansuo-2 (Shiyan-2) | Electro-optical |
| Shiyan-3 | Electro-optical |

CHINESE SATELLITE IMAGING CAPABILITIES CONTINUED

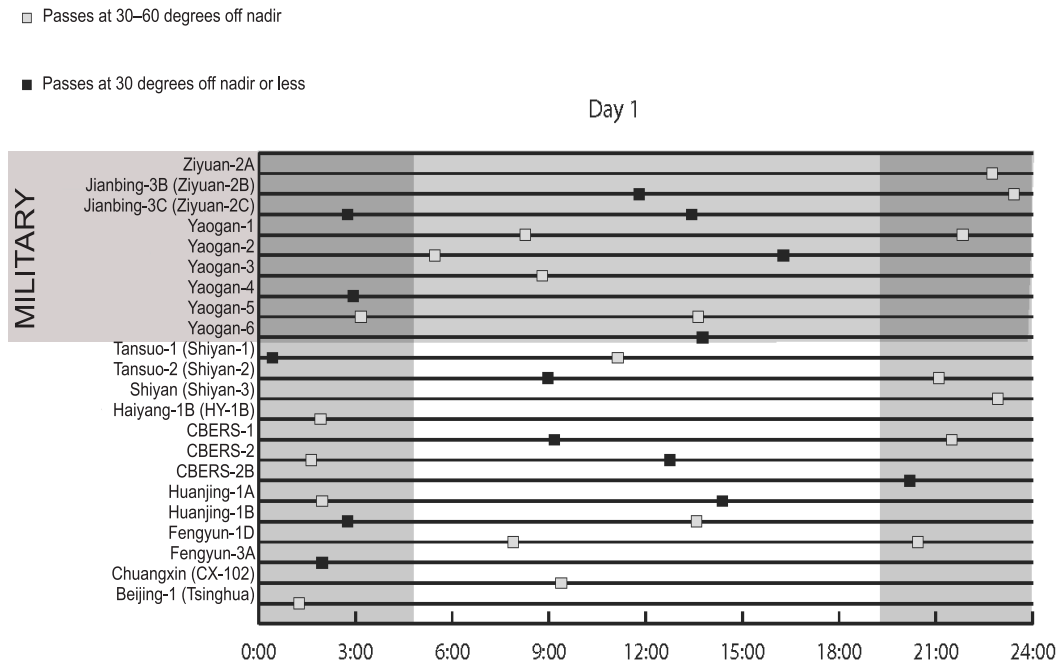
| Satellite | Sensor Capabilities |
|----------------------|---|
| Haiyang-1B | Chinese Ocean Color and Thermal Scanner; pixel resolution: 1.1 km (nadir); the swath width is ~1,600 km; field of vision (swath pixels per scan line ± 55 degrees at 2,800 km); focal length of optical system: 650 mm for visible near infrared, 190 mm for thermal infrared; telescope aperture diameter 200 mm |
| CBERS-1 | Wide Field Imager camera (spatial resolution: 260 km; ground swath 890 km); CCD (spatial resolution: 20 m; swath width: 113 km); infrared multispectral scanner (resolution: 80 m); thermal channel: 160 m; swath width: 120 km; off-nadir capability of ± 32 degrees |
| CBERS-2 | Wide Field Imager camera (spatial resolution: 260 km; ground swath 890 km); CCD (spatial resolution: 20 m; swath: 113 km); infrared multispectral scanner (resolution: 80 m); thermal channel: 160 m; swath width: 120 km; off-nadir capability of ± 32 degrees |
| CBERS-2B | Wide Field Imager camera (spatial resolution: 260 km; ground swath 890 km); CCD (spatial resolution: 20 m; swath width: 113 km); high-resolution camera (resolution: 2.7 m; swath width: 27 km); also near-infrared bands |
| Huanjing-1A | Multispectral CCD camera (resolution: 30 m; swath 700 km with two cameras); infrared sensors (30 m spatial resolution), real-time imaging; optical |
| Huanjing-1B | Hyperspectral; infrared (30 m spatial resolution); real-time imaging; optical sensor |
| Fengyun-1D | Visible, infrared, and microwave |
| Fengyun-3A | Spatial resolution of 250 m; 10-channel visible and infrared radiometer (VIRR); moderate resolution visible and infrared imager (MODI); microwave radiation imager (MWRI), measures thermal microwave emissions using six frequency points in dual polarizations; infrared atmospheric sounder (IRAS) |
| Chuangxin (CX-102) | Microsatellite; electro-optical |
| Beijing-1 (Tsinghua) | Panchromatic image (4 m resolution); multispectral images (32 m resolution); infrared band wavelength (774 nm to 900 nm) |

Simulation

In the lead-up to an ASBM launch, how good would China's view from space be? Our simulation of the satellite ground tracks and revisit rates of China's imaging satellites (nine military and thirteen civilian) shows that even in a best-case scenario, coverage is intermittent and punctuated by long blackouts during which no imagery can be obtained.⁷⁷ Counting all twenty-two satellites and assuming the widest field of view (that is, up to sixty degrees off nadir), the average time between revisits is forty-five minutes, with fourteen passes over the selected target areas each day—but with nine gaps in coverage of two hours or longer. The worst-case scenario, counting only military-designated satellites and imaging a conservative field of view (thirty degrees off nadir or less), gives an average of eight passes per day. In both scenarios, however, coverage is not evenly distributed, with large gaps of five and a half to ten hours, depending on field of view.⁷⁸ Overall, China was “in the dark” for sixty-nine of the seventy-two

hours simulated. Still, between the long gaps there were several notable clusters of satellite passes in which frequent imagery could be gathered.⁷⁹ The most optimistic list of all China's imaging satellites yields three notable periods in which up to eight satellites make passes within an hour and a half. These few instances of relative operational clarity would be good opportunities for launch, but the U.S. Navy would no doubt be conscious of these fleeting moments and plan its maneuvers and defenses accordingly.

FIGURE 4
SATELLITE SIMULATION (DAY 1)



Filling the Gaps

In their regular orbits, China's satellites do not appear capable of gathering timely, on-demand data for targeting; however, in a time of conflict China would employ several measures to boost coverage. First, it would shift satellites into more advantageous orbits to gain imagery sooner and more often than their regular orbits would allow. But altering orbits is no easy feat, and each move requires intensive planning and calculation. We did not model the numerous potential rearrangements for this article; however, useful comparisons can be derived from other technical studies. Some analyses, restricting fuel expenditures to a reasonable amount, have illustrated that the average time between revisits of a designated location can be decreased by 36.4 percent.⁸⁰ While the fuel capacities of China's military-designated satellites are likely large enough to

allow more fuel for orbital shifts, it should be remembered that because a CSG is not a stationary point, orbits would have to be continually changed, in accordance with its suspected location.

China could also plug holes in its coverage by launching microsattellites.⁸¹ These could be technologically similar to the Huanjing or Haiyang series, which are effective for maritime reconnaissance and are small enough to launch relatively quickly with small rockets.⁸² However, microsattellites come with significant trade-offs. Their small size and power reserves are not well suited to large, electricity-hungry radar systems, and their downlink capabilities are restricted by small antennas and limited fields of view.⁸³ Some of these challenges may be surmountable, with several studies suggesting that networked constellations or special antennas could improve microsattellite performance.⁸⁴ China's exact capabilities in these areas are not publicly known, but suffice it to say that the PLA will face major technological obstacles to integrating microsattellites seamlessly into its larger C4ISR picture.

China would also face challenges in putting microsattellites into orbit. Smaller solid-fuel rocket systems such as the Kaituoze (Pioneer) are likely under development;⁸⁵ nonetheless, the ability to launch "responsively" and in larger numbers is often cited by Chinese strategists as a bottleneck problem for China's military space program, due to limitations in fixed launch sites as well as telemetry, tracking, and control (TTC) stations.⁸⁶ TTC stations and launch facilities are also seen as highly vulnerable to attack. Nevertheless, the ability to quickly put small satellites into low earth orbit using small, solid-fuel rockets provides significant opportunities to reduce vulnerability. As for the difficulties in simultaneously launching larger numbers of satellites, during the last several years China has increased its number of satellite launches in short windows of time, with a peak of seven during a four-month period in 2004, demonstrating an ability to maintain a higher tempo of satellite launches and TTC activity.⁸⁷ In addition, the construction of the space launch facility in Hainan Island would increase China's overall launch and TTC capability.⁸⁸

Long-Term Plans

In the Haiyang and Huanjing series alone, China could launch within the next five years between eight and twelve new-generation satellites that would be capable of maritime surveillance, and eight to twelve more in the five years thereafter. These are tentative estimates, but they are also only the plans currently made public (a table is available on the Web version of this article, at www.usnwc.edu/press). Moreover, these estimates do not include satellites launched for dedicated military use, such as the Ziyuan or Yaogan series. Information on those programs is far less clear, but extrapolating from their rates of launch

over the past few years, on-orbit assets of these types could increase from their current nine to more than fifteen within a five-year period. The steady progress in the satellite sensor technology and the emphasis placed on remote-sensing technology overall in the last two five-year plans and the space white papers suggest little reason to doubt that recent trends will continue. In theory, the remote-sensing capabilities needed for near-continuous coverage within the Asia-Pacific region could be achieved within five years and a broader, continuous global coverage within ten years. How much these additional satellites will improve China's ability to pinpoint targets at sea will depend on the degree to which they are optimized for such a mission. However, China's space program is highly "dual use" in nature, run by numerous agencies, and applied to many missions, both military and civilian; thus, specific analysis of its development is crucial.

Measuring Up

The most obvious benchmark for China's space reconnaissance programs is parity with those of the United States. Judging from publicly available data, the United States has roughly fourteen LEO satellites dedicated to providing imagery.⁸⁹ While U.S. reconnaissance satellites are technically advanced, the system's temporal resolution is not dramatically better than that of China. Where the United States definitively leads China is in the area of data processing and integration. Perhaps the most important aspect of the American space reconnaissance system is its ability to pool imagery from a variety of military, civilian, and commercial services and distribute it in a timely fashion. Within five minutes of its capture by a satellite, the National Geospatial-Intelligence Agency can begin analyzing an image and can then transmit it to field commanders within seconds.⁹⁰ Reports from 2003 operations in Iraq put the time from target identification to strike at less than fifteen minutes.⁹¹ This speed depends on an intricate web of data-relay satellites, such as the Milstar, TDRSS, and NAVSTAR systems, the equivalents of which China does not yet possess.

At present, neither country has the capability to watch a target continuously from space, even in a regional conflict. The United States has put forward plans to build space-based radar and imaging systems that approach global, near-continuous coverage, but the two proposed projects have encountered funding disagreements and exceeded budgets.⁹² Both projects are currently stalled, and their futures remain uncertain.

Most useful to China, particularly in the context of acquiring targets for an ASBM, would be capabilities similar to the Discoverer II project, such as satellites equipped with both SAR and the Ground Moving Target Indicator system (which uses Doppler pulses to locate moving objects in a wide field of view,

making it particularly useful for watching ocean traffic).⁹³ However, while China would not need the full constellation of twenty-four satellites proposed in the U.S. system to support a regional conflict, the cost would still be prohibitive. Including the extensive complementary ground systems required, the U.S. Congressional Budget Office estimated the total cost of the Starlite/Discoverer II project to be between \$25 and \$90 billion.⁹⁴ However, if the PLA intends to deter the U.S. Navy credibly with conventional missile programs, China may indeed need to make extravagant expenditures in space. The American military's dependence on satellite imagery is tempered by a highly developed UAV program and overwhelming air superiority, but China presently lacks such advantages.

BEYOND AN ANTISHIP BALLISTIC MISSILE

Is China developing an antiship ballistic missile? The literature is fairly conclusive that China's military is keenly interested in the system and could leverage a number of off-the-shelf technologies, particularly with regard to the DF-21 missile system itself, in developing one. However, the theoretical and less-than-systematic nature of technical studies indicates that the research and, in some cases, testing of component technologies remain in their early phases. Furthermore, a fully operational and effective ASBM is a complex system that requires a network of ground, air, sea, electronic, and information infrastructures, most of which lag far behind the missile technology itself. Among these, a key underdeveloped system is precision targeting of a maneuverable object at long range, particularly the space-based segment. Real-time, continuous coverage of the maritime regions where China would most likely engage a U.S. carrier strike group would require a far better developed early-warning, imaging, and communication space architecture, along with more ground support, than it currently has. China's imaging capability alone remains far from sufficient to provide the high revisit rates needed for an effective ASBM capability. There are remedial short-term options, such as rapid launch of additional satellites or use of the full suite of civilian and government satellites, but all have strategic drawbacks for China.

The most immediate obstacle to utilizing China's full spectrum of space assets lies in the fact that this is a highly dual-use area. Interservice and interagency cooperation, particularly coordination in the areas of technology development, data sharing, command, and future investment in on-orbit assets, all raise thorny problems for application to a specific military mission.⁹⁵ The example of Beidou and the long development process that has plagued it testifies to the difficulties inherent in an expensive and complex dual-use project.⁹⁶ For these and many other reasons, these critical components of space-based support will collectively represent a difficult and slow sector in the development of a battle-ready ASBM.

In fact, much of the thinking on how to accomplish this has only just begun. Yet in an optimistic estimate based on China's current trajectory of military space asset programs, as well as its overall plans for a variety of imaging and communication satellites, a system competent to provide near-real-time regional coverage could be five years away, while global coverage could be attainable within ten years.

Most of the attention in military circles has been narrowly focused on China's ASBM. But what are the broader implications of this "system of systems" for China's military modernization? If China eventually acquires a complete targeting network to complement an ASBM capability, the Chinese military could conceivably adapt the system to other launch platforms (e.g., ships), other missiles (short-range or intercontinental ballistic missiles), or relevant technologies (missile defense). The parallels with the conventionalization of U.S. strategic weapons ("global strike") become unavoidable.⁹⁷ While it is merely conjecture, one could infer—from the advances made in China's short-range ballistic missile numbers and capabilities facing Taiwan, in addition to ASBM and even antisatellite testing—an emerging PLA strategy aimed more at missile-based, asymmetrical deterrence than parity in hardware. Do these trends point to a growing missile-centric PLA doctrine? Perhaps, but there are just as many voices clamoring for a strategy of mimicking American weapons platforms (such as an aircraft carrier) as there are proponents of a greater reliance on deterrent, asymmetrical systems.

While an operational ASBM may be some time away, the impact of such a system on the stability of U.S.-China strategic relations and on the region would be substantial. Short of using it in a conflict—a scenario nearly impossible to imagine—a number of questions arise regarding the effect an ASBM capability might have on both Chinese and American behavior. How would an ASBM alter China's perception of its strategic environment? Would an operational ASBM merely provide greater assurance against American intervention in a Taiwan conflict, or would it embolden Beijing to act more aggressively? What about China's deterrent posture, which it consistently frames as solely defensive? It is in this sense that Chinese and American perspectives perhaps clash the most. China argues that intent, not merely capabilities, decides behavior.⁹⁸ China would thus contend that an additional weapon capability will not influence its future actions. The United States would hold that capability is far more important to influencing behavior and that a better-armed China might pursue objectives it otherwise would not. For nuclear weapons, with an extremely high threshold for use, the Chinese position has been tenable and believable. However, conventional weapons lower the threshold for use, and crossing that threshold is easier to imagine.

Furthermore, the deployment of antiship ballistic missiles would logically seem to blur the lines between offensive and defensive strategy.⁹⁹ The most effective use of the ASBM would be a strike on a carrier strike group at long range as it steams toward waters east of the Taiwan Strait, before its cruise missiles and air-strike capability could be employed. Once the CSG came close enough to launch strikes, the asymmetric advantage of the ASBM would be limited. In other words, China might have to decide whether to strike first, perhaps even preemptively. This could greatly impact crisis stability in a confrontation between China and the United States, as well as influence longer-term competition. The dangers of escalation would be grave, since the United States would need to consider China's options and respond accordingly. Over the longer term, an arms race is a very real possibility: the United States, which still holds a significant lead in naval power and most military technologies, would not sit still while China developed the ASBM.

The advent of an ASBM would be more than an incremental advance in weaponry; it could be a strategic "game changer," as others have dubbed it.¹⁰⁰ Accordingly, the impact an ASBM capability will have on security perceptions, deterrence strategies, and escalatory control point to the need for a much more intensive and sustained military-to-military dialogue than is currently under way. As yet another sign of China's growing might, the missile would be an important, singular development in the continuing shift away from U.S. strategic dominance in the western Pacific. Such a transformation would not go uncontested, and will bring a number of risks that could draw the two sides into heightened competition and even conflict. But there will also be repeated opportunities to stave off military competition in favor of mutual accommodation and a cooperative regional approach. This process is dependent on building trust through transparency, as each side becomes more confident about the other's capabilities and intents and as facts, not fears, can inform the actions and responses of decision makers on both sides.

NOTES

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1. Interview with Rear Adm. Eric McVadon, USN (Ret.), 1 June 2009.
2. 黄洪福 [Huang Hongfu], "常规弹道导弹打击航母编队的设想" [Concepts Regarding ABMS Attack on Aircraft Carrier Group],

科技研究 (第二炮兵科学技术委员会) [Research under the Commission on Science and Technology of the PLA Second Artillery], no. 1 (2003), pp. 6–8.

3. "中国反舰弹道导弹发展探讨" [Discussion of China's ASBM Development], Tiexue BBS, see bbs.tiexue.net/.
4. The literature varies in both quality and authoritativeness. First of all, there is a

surprising amount of diversity of accessible discussion and analysis on this subject, covering not only its capability but also the merits—or lack thereof—of pursuing such a weapon system. This may imply something about its operational status, but it may also indicate the growing difficulty in hiding a major defense system from the proliferation of publications and online discussion. Moreover, the wide range of discussion in the literature may stem from military interservice competition. As is often the case with discussions on China's defense issues, the authority of the sources varies substantially and is difficult to decipher. For instance, several of the most lucid and detailed debates on China's ASBM system have been published by a number of specialist magazines, including *Naval and Merchant Ships*, *Modern Ships*, and *Shipborne Weapons*. Yet these magazines are highly commercialized, and while their editorial staffs may offer a degree of expertise or have a certain amount of access to insider experts, most of these commentaries are opinions or pieced together using open sources. Thus a high degree of caution is needed when reading them. This article surveys the literature largely without discrimination, although it focuses on technical and authoritative publications.

5. 杨颖 [Yang Ying], 王明海 [Wang Minghai], 第二炮兵工程学院 [The Second Artillery Engineering College], “弹道导弹打击航母初探” [Primary Research of Ballistic Missile Attack on Aircraft Carrier], 飞行力学与飞行试验 [Proceedings of Flight Dynamics and Flight Experiments], 2006 学术交流年会论文集 [2006 Annual Academic Conference].
6. 邱贞玮, 龙海燕 [Qiu Zhenwei and Long Haiyan], “中国反舰弹道导弹发展探讨” [A Discussion about the Development of Chinese Antiship Ballistic Missiles (Combat Scenario)], 现代舰船 [Modern Ships] 12B (2006).
7. William K. Brickner, “An Analysis of the Kill Chain for Time Critical Strike” (master's thesis, Naval Postgraduate School, Monterey, California, June 2005).
8. The scope and importance of this system seem to warrant development of a full-fledged method that would provide consistent and accurate targeting information. However, this does not mean that a new ASBM, when developed, will certainly be impotent until a fully reliable targeting system is in place. A less robust scheme could be employed, particularly as an interim means for targeting. For instance, the U.S. Navy could not ignore the threat of rudimentary targeting information received from, for example, a picket submarine, a fishing vessel, or cargo ship.
9. Used consistently in all specific references to it. In addition, the range requirements in technical documents coincide with the DF-21 capabilities. For instance, see 谭守林, 张大巧, 刁国修 [Tan Shoulin, Zhang Daqiao, and Diao Guoxiu] (of the Second Artillery Engineering College and PLA Unit 96311), “弹道导弹打击航空母舰末制导有效区的确定与评估” [Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile Attacking Aircraft Carrier], 指挥控制与仿真 [Command Control and Simulation] 28, no. 4 (August 2006). See also Yang Ying and Wang Minghai, “Primary Research of Ballistic Missile Attack on Aircraft Carrier.”
10. For instance, equipping the missile with both the ability to pierce an aircraft carrier using nonconventional explosives and with the precision guidance and maneuverability to find it. See 陈新民, 余梦伦 [Chen Xinmin and Yu Menglun], “基于功能分析法的导弹基准方案设计方法” [Design Method of Missile Baseline Concept Based on Function Analysis], 导弹与航天运载技术 [Missiles and Space Vehicles], no. 4 (2008).
11. This additional stage is described as a hybrid solid-liquid fuel booster. See 陈海东, 余梦伦 [Chen Haidong and Yu Menglun], “机动再入飞行器的复合制导方案研究” [Study of a Compound Guidance Scheme for Maneuvering Reentry Vehicles], 宇航学报 [Journal of Astronautics] 22, no. 5 (September 2001).
12. See 姜宗林 [Jiang Zonglin], “中国科学院高温气体动力学重点实验室研究进展” [Research Results of CAS Key Laboratory of High Temperature Gas Dynamics], 力学进展 [Advances in Mechanics], no. 2 (2008).
13. Some of this discussion predates direct reference to the ASBM, since the anticarrier version of the DF-21 evolved from *Julang-1*. The JL-1 was the nuclear-tipped, submarine-launched medium-range ballistic missile

- capable of maneuvering to heighten defense penetration. See www.fas.org/nuke/guide/china/theater/df-21.htm.
14. The airborne laser (ABL) does not appear to be of much concern, since it has a shorter range, an issue that “China could easily overcome by launching the ASBM several hundred kilometers inland.” Furthermore, modest terminal guidance would suffice to outmaneuver the PAC-3. See Chen Xinmin and Yu Menglun, “Design Method of Missile Baseline Concept Based on Function Analysis.”
 15. 谷良贤, 龚春林, 吴武华 [Gu Liangxian, Gong Chunlin, and Wu Wuhua], “跳跃式弹道方案设计及优化” [Design and Optimization of Wavy Trajectory for Ballistic Missiles], 兵工学报 [Binggong Xuebao (Journal of Munitions Industries)], no. 3 (May 2005).
 16. For weaving, 姜玉宪, 崔静 [Jiang Yuxian and Cui Jing], “导弹摆动式突防策略的有效性” [Effectiveness of Weaving Maneuver Strategy of a Missile], 北京航空航天大学学报 [Journal of Beijing University of Aeronautics and Astronautics], no. 2 (April 2002). For spiraling, Li Sudan et al., “Spiral Maneuver for Warhead Reentry Vehicle,” *Yuhang Xuebao* [Journal of Astronautics], October 2000. For spinning, 邱贞玮, 龙海燕 [Qiu Zhenwei and Long Haiyan], “930 秒—中国反舰弹道导弹 发展探讨 (作战假想)” [930 Seconds: A Discussion about the Development of Chinese Antiship Ballistic Missiles (Combat Scenario)], 现代舰船 [Modern Ships] B (January 2007). For gliding, Jiang Zonglin, “Research Results of CAS Key Laboratory of High Temperature Gas Dynamics.”
 17. Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, “Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile Attacking Aircraft Carrier.”
 18. Jiang Zonglin, “Research Results of CAS Key Laboratory of High Temperature Gas Dynamics.”
 19. Gu Liangxian, Gong Chunlin, and Wu Wuhua, “Design and Optimization of Wavy Trajectory for Ballistic Missiles.”
 20. 陈海东, 余梦伦, 辛万青, 李军辉, 曾庆湘 [Chen Haidong et al.], “再入飞行器攻击慢速活动目标的制导方案研究” [Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets], 导弹与航天运载技术 [Missiles and Space Vehicles], no. 6 (2000). Also see 程凤舟, 万自明, 陈士槽 [Cheng Fengzhou, Wang Ziming, and Chen Shilu], “大气层外动能拦截器末制导分析” [Terminal Guidance Analysis of an Extra-atmospheric Kinetic-Kill Vehicle], 飞行力学 [Journal of Flight Dynamics], pp. 38–41.
 21. There are some exceptions to this. The article talks below about employing concealment and decoy measures such as balloons, cooled shrouds, and other measures. See Qiu Zhenwei and Long Haiyan, “930 Seconds.”
 22. See presentations by Richard L. Garwin and Phillip Coyle at The Changing Nature of Ballistic Missile Defense conference, National Defense University, 2 June 2009, available at www.ndu.edu/.
 23. See Huo Fei and Luo Shiwei, “Wu Gong Zhi Jian—Fan Hang Mu Dan Dao Dao Dan Xiao Neng Ji Shi Yong Hua Ping Gu” [Arrows without Bows: An Evaluation of the Effectiveness and Employment of Anti-Aircraft Carrier Ballistic Missiles], *Modern Ships*, no. 325 (April 2008). On the U.S. side, a former director of missile defense testing agrees; interview with Phillip Coyle, 9 June 2009.
 24. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets”; Chen Haidong and Yu Menglun, “Study of a Compound Guidance Scheme for Maneuvering Reentry Vehicles.”
 25. 孙鹏, 张合新, 孟飞 [Sun Peng, Zhang Hexin, and Meng Fei] (of the Second Artillery Engineering College), “再入飞行器最优减速研究” [Research of the Optimal Deceleration Speed of the Reentry Vehicle], 导弹与航天运载技术 [Missiles and Space Vehicles], no. 2 (2006).
 26. Huo Fei and Luo Shiwei, “Arrows without Bows,” p. 28; 董露 [Dong Lu], “弹道导弹能打航母吗?” [Can Ballistic Missiles Be Effective against Aircraft Carriers?], 舰船知识 [Naval and Merchant Ships] (December 2007), p. 20; 高卉 [Gao Hui], “弹道导弹打航母五大难” [Five Major Difficulties in Attacking Aircraft Carriers with Ballistic Missiles], 舰船知识 [Naval and Merchant Ships] (December 2007), pp. 15–16; and Chen Haidong et al., “Study for the Guidance

- Scheme of Reentry Vehicles Attacking Slowly Moving Targets.”
27. Gao Hui, “Five Major Difficulties in Attacking Aircraft Carriers with Ballistic Missiles.”
 28. Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, “Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile Attacking Aircraft Carrier”; see also Chen Haidong and Yu Menglun, “Study of a Compound Guidance Scheme for Maneuvering Reentry Vehicles.”
 29. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets.”
 30. Gu Liangxian, Gong Chunlin, and Wu Wuhua, “Design and Optimization of Wavy Trajectory for Ballistic Missiles.”
 31. Ibid.
 32. 谭守林, 李新其, 李红霞 [Tan Shoulin, Li Xinqi, and Li Hongxia], “弹道导弹对航空母舰打击效果的计算机仿真” [Computer Simulation of Damage Efficiency for Aircraft Carrier under Attack of Tactical Ballistic Missile], 系统仿真学报 [Journal of System Simulation] 18, no. 10 (2006).
 33. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets.”
 34. Discussed below. The flight time of the missile is roughly twelve to fifteen minutes, assuming a 1,500–2,000 km distance. Downlinking of imagery takes close to five minutes for the United States, using a high-bandwidth downlinking capability that China likely does not currently possess.
 35. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets.” For millimeter-wave radar, Yang Ying and Wang Minghai, “Primary Research of Ballistic Missile Attack on Aircraft Carrier.” For radar or infrared terminal phase, Tan Shoulin, Li Xinqi, and Li Hongxia, “Computer Simulation of Damage Efficiency for Aircraft Carrier under Attack of Tactical Ballistic Missile.”
 36. Tan Shoulin, Li Xinqi, and Li Hongxia, “Computer Simulation of Damage Efficiency for Aircraft Carrier under Attack of Tactical Ballistic Missile.”
 37. Dong Lu, “Can Ballistic Missiles Be Effective against Aircraft Carriers?”
 38. Evan Medeiros et al., *A New Direction for China's Defense Industry*, Project Air Force (Santa Monica, Calif.: RAND, 2005), pp. 51–106.
 39. Sun Peng, Zhang Hexin, and Meng Fei, “Research of the Optimal Deceleration Speed of the Reentry Vehicle.”
 40. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets.”
 41. Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, “Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile Attacking Aircraft Carrier.”
 42. Gao Hui, “Five Major Difficulties in Attacking Aircraft Carriers with Ballistic Missiles.” This concern is not without cause. The U.S. Navy's Third Fleet recently tested the Aegis-based SM-2 against both a cruise missile and a short-range ballistic missile. See “Navy Completes Air and Ballistic Missile Exercise,” Navy.mil, 27 March 2009. However, U.S. critics contend that all missile-defense tests to date have been highly scripted, making missile defense incompetent for most missile threats, both ballistic and cruise. See Phillip Coyle's presentation at The Changing Nature of Ballistic Missile Defense conference. On the other hand, a number of reports suggest there is a higher degree of defense against cruise missiles, a fact that could be relevant for the ASBM, as it takes on ballistic/cruise hybrid characteristics during its terminal phase. See a 2004 CRS report (available at www.au.af.mil/au/awc/awcgate/crs/rs21921.pdf) stating that both an F-15's air-to-air missiles and surface-to-air missiles could intercept incoming cruise missiles.
 43. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets”; Yang Ying and Wang Minghai, “Primary Research of Ballistic Missile Attack on Aircraft Carrier.”
 44. 郭伟民, 赵新国, 李强 [Guo Weimin, Zhao Xinguo, and Li Qiang], “卫星军事应用系统支援常规导弹作战Petri网建模” [Modeling of Conventional Missile Operation Supported by Satellite Military Systems with Petri Net], 系统工程与电子技术 [Systems Engineering and Electronics], no. 2 (2009); 王隼, 杨劲松, 黄韦昆, 王贺, 陈鹏 [Wang Juan, Yang Jinsong, Huang Weigen, Wang He, and Chen Peng], 卫星海洋环境动力

- 学国家重点实验室, 国家海洋局, 第二海洋研究所, 杭州 [State Key Laboratory of Satellite Ocean Environmental Dynamics, Second Institute of Oceanography, State Oceanographic Agency, Hangzhou], “多视处理对SAR船只探测的影响” [The Impact of Multilook Processing on Synthetic Aperture Radar Ship Detection], 遥感学报 [Journal of Remote Sensing] 12, no. 13 (May 2008), pp. 399–404; 张宇, 张永刚, 王华, 张旭 [Zhang Yu, Zhang Yonggang, Wang Hua, and Zhang Xu], “二类水体中船舶含气气泡尾迹海水表面光学特性的测量与分析” [Measurement and Analysis of Seawater AOPs of Ship Wakes with Bubbles in Case-II Waters], 遥感学报 [Journal of Remote Sensing] 1 (2008).
45. For example, comparing Chen Xinmin’s research between the articles published in 2000 and 2008, we can find this development. See Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets”; Chen Haidong and Yu Menglun, “Study of a Compound Guidance Scheme for Maneuvering Reentry Vehicles”; and Chen Xinmin and Yu Menglun, “Design Method of Missile Baseline Concept Based on Function Analysis.” The articles below, published in recent years, focus on computer simulation. See Tan Shoulin, Li Xinqi, and Li Hongxia, “Computer Simulation of Damage Efficiency for Aircraft Carrier under Attack of Tactical Ballistic Missile”; 邱涤珊, 张利宁, 祝江汉 [Qiu Dishan, Zhang Lining, and Zhu Zhijiang], “海上机动目标监视任务过程及建模方法研究” [Research on Task Process of Ocean Target Surveillance and Its Modeling Method], 军事运筹与系统工程 [Military Operations Research and Systems Engineering] 4 (2007); Wang Haiming and Li Bangjie (of the Second Artillery Engineering Academy), “Study on Modeling of Ballistic Missile Kill Efficiency,” *Fire Control and Command Control*; and Wang Hui, Tian Jinsong, and Zhang Liying, “Research on Firepower Control of Ballistic Missile Base on Flight Time,” *Fire Control and Command Control* 30, no. 4 (August 2005).
 46. Jiang Zonglin, “Research Results of CAS Key Laboratory of High Temperature Gas Dynamics.”
 47. Wang Juan et al., “The Impact of Multilook Processing on Synthetic Aperture Radar Ship Detection,” pp. 399–404.
 48. Gao Hui, “Five Major Difficulties in Attacking Aircraft Carriers with Ballistic Missiles.”
 49. For different OTH systems relevant to ASBM see geimint.blogspot.com/2008/11/oth-radar-and-asbm-threat.html.
 50. Evidence that China’s OTH-B system is operational comes from sources that suggest the China Meteorological Agency’s first ground-based ionosphere observation station began installation in Xiamen on 2 April 2007. Ionosphere observation is essential to ensure reliable wireless communication and navigation, and it has direct military application. See “厦门地基电离层观测站开始建设” [Xiamen Ground-Based Ionosphere Observation Station Begins Installation], 13 April 2007, www.spaceweather.gov.cn/item/conferences/12.php. Internet sources cite Xiangfan, Hubei Province, as the location for the OTH installation itself, but this is not confirmed by other sources; see Abbs.top81.cn/.
 51. None of the Chinese technical sources indicate that China is considering or could rely solely on OTH for targeting. For tracking error, 包养浩, 王军 [Bao Yanghao and Wang Jun], “超视距雷达系统设计考虑” [Design Consideration for Beyond-Visual-Range (BVR) Radar System], 现代雷达 [Modern Radar] 1 (1991). For U.S. OTH accuracy, 杨志群 [Yang Zhiquan], “Research on Signal Processing of Sky-Wave Over-the-Horizon Radar” (PhD diss., Nanjing University of Science and Technology, 2003); see also bbs.cjdbdy.net/.
 52. This conclusion is based on several factors. First, China has launched ELINT-capable satellites in the past, according to the introduction to 上海航天科技工业展示馆简介 [Shanghai Space Science and Technology Industry Museum], and 陈杏泉 [Chen Xingquan], “中国航天火箭发射列表” [Spreadsheet of China’s Space Launch], at 天益社区 [Tianyi Blog], available at bbs.tecn.cn/viewthread.php?tid=320357. Second, sources suggest China is developing “large, deployable antenna technologies for SIGINT satellites,” according to 王援朝 [Wang Yuanchao], “大型星载电子侦察天线结构技术的发展” [Development of Technology of Antenna Structure Technologies for Large-Size Satellite-borne Electronic Surveillance], 通信对抗 [Communication

- Countermeasures], no. 4 (2006). Studies have also been reported by 孙洋, 邱乐德 [Sun Yang and Qiu Yuede], “电子侦察卫星初探” [Preliminary Investigation of Electronic Surveillance Satellite], 2008 年中国西部青年通信学术会议论文集 [Collected Works from Academic Conferences for Young Sciences of West China], and 康少单 [Kang Shaodan], “基于电子侦察和光学成像侦察的目标综合识别算法研究” [Research on Algorithm for Synthetic Identification of Target Based on Electronic Surveillance and Optical Imaging Surveillance], 国防科学技术大学 [National University of Defense Technology] (2003).
53. 强岁红 [Qiang Suihong], “我国无人机发展之思考” [Some Thoughts for the Development of UAV in China], 航空科学技术 [Aeronautical Science and Technology], no. 6 (2005); “中国无人侦察机可飞7500公里” [China's UAV Can Fly 7500 km], 世界新闻报 [News of the World], 8 November 2006.
 54. One source suggests that China will have these capabilities between 2010 and 2015. One of the proposals for the 2006 elite curriculum of Northwest Polytechnic University suggests ongoing research in this area. 西北工业大学2006年度省级精品课程建设项目申请书中包括高空长航时无人机总体设计技术 [Proposal for 2006 Elite Curriculum of Northwest Polytechnic University Includes General Design Technology of UAVs for Prolonged Periods of Flying at High Altitude], 总装备部十五国防装备预先研究 [PLA GAD 15th National Defense Armament Pre-research, 2001–2005].
 55. Eliminating an unmanned aerial vehicle would have less risk of escalation than knocking out a reconnaissance satellite, for instance.
 56. Eric McVadon suggests that Shang-class SSNs or Kilo-class diesel-electric submarines may be quiet enough to approach a carrier; even units of the less capable Romeo and Ming classes may be helpful if they lie in wait, using passive acoustic measures or float electronic intelligence antennas on the sea surface. See Eric A. McVadon, “China's Maturing Navy,” *Naval War College Review* 59, no. 2 (Spring 2006), pp. 90–107, and “Development of a ‘New PLA’: Missiles and Maritime Reality, Implications, and Prospects,” Republic of China's National Defense University 7th National Security and Military Strategy Annual International Conference, Taipei, 19 October 2006.
 57. It is logical that China would rely on them if forced to—for instance, if a conflict took place before China had a robust targeting system in place.
 58. The risks of escalation and the costs of using a system that is not dependable may be prohibitive. Moreover, the “deterrent value” of such a system is also cited as a key issue: the more robust the system, the stronger its deterrent value and, ironically, the less likely it will have to be employed. For relevant discussions, see Huo Fei and Luo Shiwei, “Arrows without Bows”; and Gao Hui, “Five Major Difficulties in Attacking Aircraft Carriers with Ballistic Missiles.”
 59. For instance, see Li Xinqi, Bi Yiming, and Li Hongxia (of the Second Artillery Engineering College), “海上机动目标的运动预测模型及精度分析” [Movement Forecast Model and Precision Analysis on Maneuvering Targets on the Sea], 火力与指挥控制 [Fire Control and Command Control] 30, no. 4 (August 2005); and Tan Shoulin, Zhang Daqiao, and Diao Guoxiu, “Determination and Evaluation of Effective Range for Terminal Guidance Ballistic Missile Attacking Aircraft Carrier.”
 60. Chen Haidong et al., “Study for the Guidance Scheme of Reentry Vehicles Attacking Slowly Moving Targets.”
 61. Qiu Dishan, Zhang Lining, and Zhu Zhijiang, “Research on Task Process of Ocean Target Surveillance and Its Modeling Method.”
 62. 李杰 [Li Jie], 海军军事学术研究所 [Navy Military Academic Research Institute], “弹道导弹是航母的‘克星’吗?(下)” [Is the Ballistic Missile the “Silver Bullet” of Aircraft Carrier? (II)], 当代海军 [Modern Navy] (March 2008).
 63. Qiu Dishan, Zhang Lining, and Zhu Zhijiang, “Research on Task Process of Ocean Target Surveillance and Its Modeling Method.”
 64. This conclusion is based on the fact that the literature on space-based support for conventional missiles in general and ASBMs specifically lags behind other technologies directly related to the ASBM system. Studies on space information systems applied to missile missions appear to have only increased

- in frequency around the 2005 time frame. Moreover, the studies are analyses and mathematical models of integration and optimal-use application of space information for missile operations. In other words, the treatments are very theoretical, with few specifics on matching satellite applications with military missions—a study that appears to be in its infancy. See Guo Weimin, Zhao Xinguo, and Li Qiang, “Modeling of Conventional Missile Operation Supported by Satellite Military Systems with Petri Net”; and 潘长鹏, 顾文锦, 陈洁 [Pan Changpeng, Gu Wenhui, and Chen Hao], “军事卫星对反舰导弹攻防作战的支援能力分析” [Analysis of Ability of Military Satellites to Support Antiship Ballistic Missiles in Defensive and Offensive Operations], 情报交流 [Space Flight Missiles], no. 5 (2006); 高飞, 胡绪杰, 高凌云, 刘向民 [Gao Fei, Hu Xujie, Gao Lingyun, and Liu Xiangmin], “军事卫星信息系统对导弹作战的影响分析” [An Analysis of the Action of Space Information Support on Missile Operations], 国防科技 [Defense Technology] 29, no. 4 (2008); 胡绪杰, 刘志田, 王默, 孙宇, 乔添 [Hu Xujie, Liu Zhitian, Wang Mo, Sun Yu, and Qiao Tian], “天基信息支援对导弹攻防作战的效用分析” [Analysis of the Effectiveness of Space Information Support to Missile Operations], 航天器工程 [Spacecraft Engineering] 18, no. 1 (2009).
65. 李杰, 郭建平, 鞠百成 [Li Jie, Guo Jianping, and Ju Baicheng], “太空力量对海上作战的影响及发展对策” [Impacts of Space Forces on Maritime War Fighting and Countermeasures], 空天一体与空军建设征文选集 [Collected Works of Aerospace Integration and Air Forces Construction, edited by Air Force Command College Research Department] (December 2005), pp. 258–63.
 66. 刘江, 李青 [Liu Jiang and Li Qing], “关于空军‘空天一体, 攻防兼备’转型建设的几点思考” [Thoughts on the Air Force’s Transition toward (the Doctrine of) “Integration of Aerospace, Combination of Defense and Attack”], 空军指挥学院科研部编 [Collected Works of Aerospace Integration and Air Forces Construction].
 67. Ibid, pp. 324–28
 68. Both GAD and GSD are under CMC, so they are theoretically not an issue, but numerous discussions have surfaced about the turf battles over command and leadership in this regard. See 宋振昊 [Song Zhenhao], “我军一体化建设的基本思路” [Basic Concepts on Aerospace Integration of the Air Force], 空军军事学术 [Air Force Military Science], no. 6 (2003).
 69. See article 8, “National Defense Mobilization and the State of War,” in the Law of the People’s Republic of China on National Defense, adopted at the Fifth Session of the Eighth National People’s Congress on 14 March 1997. This article does not mention space assets. But article 8 is being expanded into the National Defense Mobilization Law, which is being discussed by National People’s Congress and will be promulgated within a few years. See “China’s Military Mobilization Law to Ensure Security: Defense Minister,” Xinhua, 20 April 2009, available at news.xinhuanet.com/.
 70. 沈世禄, 冯书兴, 王佳, 李亚东 [Shen Shilu, Feng Shuxing, Wang Jia, and Li Yadong], “浅析军事航天任务指挥决策” [Research on Command Decision Making for Military Space Missions], 装备指挥技术学院学报 [Journal of the Academy of Equipment Command and Technology] 18, no. 1 (February 2007).
 71. For instance, China clearly has sophisticated airborne (UAV-based) and space-based synthetic aperture radar (SAR) for all-weather, day and night imaging, as well as other earth-imaging technologies, available to aid in such relief efforts. However, the SAR imaging platforms were not properly outfitted to quickly transfer data. Also, while the PLA has begun employing modern geographic information systems software using remote-sensing data for its surveying and mapping activities, it was not able to apply it to many of the flight paths of aviation units during the disaster relief effort. See 张强 [Zhang Qiang], “抗震救灾科技在行动” [Earthquake Relief S&T in Action], 科技日报 [Science and Technology Daily], 17 June 2008. Also, data-exchange networks for many remote-sensing satellite systems are often not freely shared among agencies; interview with 焦维新 [Ji Weixin], 北京大学地球与空间科学学院教授 [professor at the Earth and Space Science Institute at Beijing University]. See also “大地震中的遥感之憾” [Deficiencies in Remote Sensing

during Earthquake], 南方周末 [Nanfang Zhoumo (Southern Weekend)], 31 July 2008, available at www.nanfangdaily.com.cn/.

72. The main players would be GAD and GSD; however, the other four military services (PLA, PLAN, PLA Air Force, Second Artillery) and various levels of military command have been increasingly vocal in demands for shares in authority over space utilization. The internal struggle over how to structure a space command is one reason it has yet to be established. For instance, see 刘桂芳等编 [Liu Guifang, ed.], 高技术条件下的C4ISR [C4ISR under the Conditions of High Technology] (Beijing: 国防大学出版社 [National Defense Univ. Press], September 2005), p. 221. Also, see Wang Mingliang, Guo Jinsuo, and Zhang Zhengping, "Several Thoughts on Air and Space Military Issues," pp. 1–11, and Yan Zengfu, Ji Yan, and Wei Dexing, "Development and Path of the PLA Space Forces," pp. 75–80, both *Collected Works of Aerospace Integration and Air Forces Construction*.
73. China may only need one instance of good targeting information to initiate an attack. However, infrequent passes over the target area will severely limit its options for timing of attack—a factor that will greatly affect its ability to control conflict escalation.
74. The capability to achieve space-based ISR (intelligence, surveillance, and reconnaissance) for real-time, precision targeting of a moving target at sea is certainly not confined to remote-sensing satellites.
75. While the exact off-nadir imaging capabilities for China's satellites are not publicly known, there are practical considerations that will limit their ability to image at extremely high angles, including degraded resolution and problems with georeferencing. Off-nadir capabilities are listed for a few of the satellites advertised for commercial services. The CCD and panchromatic cameras on *CBERS-1*, 2, and 3 are reported to be capable of imaging at up to thirty-two degrees off nadir, the *Huanjing-1A* at thirty degrees, and the synthetic aperture radar (SAR) sensors on the *Huanjing-1C* at fixed angles of 31 and -44.5 degrees. See www.cresda.com/cn/products.htm.
76. The modeling assumes a favorable scenario in which China's other detection and early-warning sensors (such as OTH) cue the space-based sensors to a relatively confined area, since sweeping huge swaths of ocean would require either extremely high onboard data-processing rates or the transmission from satellite to ground station of all pictures of a large area. Both would take substantially more time.
77. The simulation was conducted for a seventy-two-hour period. Known-satellite figures calculated using publicly available data and freely available orbital software WinOrbit, a tracking software program designed for hobbyist telescope operators, were used in the simulation. See www.sat-net.com/winorbit/.
78. The most extreme gap measured in the simulation occurred in the early hours of the second day, with no satellites in position to obtain imagery for nearly five hours.
79. For instance, during the first day, a group of three military satellites made passes over the target within a twenty-five-minute window.
80. In a paper published early summer 2009, two authors from the Korean Aerospace Research Institute modeled, using genetic algorithms, an orbital pattern for satellites assigned to a temporary thirty-day reconnaissance mission. Fuel expenditure was restricted to 30 kg per satellite. See Hae-Dong Kim and Ok-Chul Jung, "Genetic Design of Target Orbits for a Temporary Reconnaissance Mission," *Journal of Spacecraft and Rockets* 46, no. 3 (May–June 2009).
81. In the tenth and eleventh five-year plans, China put emphasis on the development of microsatellite technology. 蒋建科 [Jiang Jianke], "我建成世界最大的小卫星研制基地" [China Establishes the Largest Base for Research and Production of Microsatellites], 人民日报 [People's Daily], 15 December 2004.
82. Ibid.
83. Michael H. Hadjitheodosiou, "Store-and-Forward Data Communications Using Small Terminals and Microsatellites" (paper, Third IEEE Symposium on Computers and Communications, Athens, 1998).
84. E. H. Peterson, G. Fotopoulos, and R. E. Zee, "A Feasibility Assessment for Low-Cost InSAR Formation-Flying Microsatellites," *Geoscience and Remote Sensing* (May 2009);

- L. Hadj Abderrahmane, M. Benyettou, and M. N. Sweeting, "An S Band Antenna System Used for Communication on Earth Observation Microsatellite" (Aerospace Conference, Big Sky, Montana, 2006).
85. 施发树, 袁斌, 陈世年 [Shi Fashu, Yuan Bin, and Chen Shinian], "发展我国空中(机载)发射固体火箭的思路和技术途径" [The Path and Technological Way for Developing Our Country's Airborne Solid-Fueled Rockets], 中国航天 [Aerospace China] (February 2003), p. 38. There is some debate about the progress of the Kaituoze system; see "Factual Errors in May 20, 2008, Written Statement from Ashley Tellis, Gregory Kulacki, and Joan Johnson-Freese," Union of Concerned Scientists website, www.ucsusa.org/assets/documents/nwgs/memo-to-uscc.pdf. However, the evidence would suggest that China continues to develop this or other systems with comparable capabilities.
86. 孟祥春, 蔡杰超 [Meng Xiangchun and Cai Jiechao], "Studies of Countermeasures of Enhancing Integration of Space Systems," *Collected Works of Aerospace Integration and Air Forces Construction*, pp. 329–37.
87. Kevin Pollpeter, "Building for the Future: China's Progress in Space Technology during the Tenth 5-Year Plan and the U.S. Response," *Strategic Studies Institute* (March 2007).
88. "Hainan to Build a Space Harbor in 2010," *Hainan Jingji Bao* [Hainan Economic Daily], 12 October 2005.
89. Data drawn from the Union of Concerned Scientists' Satellite Database, making the assumption that no satellites remain undetected by the public. In 2007, a French radar station identified twenty to thirty objects in LEO that were not included in the published U.S. Space Command (USSPACECOM) database. French authorities suggested that these were previously undiscovered U.S. spy satellites and that their orbital details would be made public if USSPACECOM did not cease publishing the orbits of French spy satellites. See Peter B. de Selding, "French Say 'Non' to U.S. Disclosure of Secret Satellites," Space.com. Hobbyist satellite trackers were highly skeptical of the French claim and insisted that all the objects in question had already been identified by amateurs; see www.satobs.org/.
90. "U.S. Space-Based Reconnaissance Reinforced," *Jane's Defence Weekly*, 17 October, 2001, available at www.janes.com/.
91. Usha Lee McFarling, "The Eyes and Ears of War," *Los Angeles Times*, 24 April 2003.
92. The Starlite/Discoverer II project was to add twenty-four radar satellites capable of revisit rates of fifteen minutes or less for most locations on earth, and the Future Imagery Architecture (FIA) project was intended to augment the Kennan KeyHole series with twelve to twenty-four electro-optical imaging satellites. See Dwayne A. Day, "Radar Love: The Tortured History of American Space Radar Programs," *Space Review*, 22 January 2007, available at www.thespacereview.com/.
93. "Discoverer II A DARPA SAR TACSAT," presentation, www.fas.org/spp/military/program/imint/Discoverer_II_Brief/index.htm.
94. Day, "Radar Love."
95. To be balanced, the fact that China's space program is highly "dual use" in operation, ownership, and utilization also provides a powerful driver for continued investment.
96. China's ability to undertake its first large-scale satellite constellation is still untested. With military, civilian, and commercial organizations (such as Beidou Star) participating in the system's development and its applications, there is still internal debate over how the system should be constructed and operated. The obstacles are huge, and the impact of these factors to the success of the system both for China's economy and its strategic goals could be decisive. See 谭述森 [Tan Susen], "北斗卫星导航系统的发展与思考" [The Development and Thought of the Beidou Navigation Satellite System], *宇航学报* [Journal of Astronautics] 29, no. 2 (2008).
97. Sgt. Sara Wood, USA, "Conventional Missile System to Provide Diverse, Rapid Capabilities," U.S. Department of Defense, 2006, available at www.defenselink.mil/news/newsarticle.aspx?id=15225.
98. For example see, 许嘉 [Xu Jia], "军事透明度与中美军事互信" [Military Transparency and Sino-U.S. Military Mutual Trust], *和平与发展* [Peace and Development] 104, no. 2 (May 2008).

99. As both Chinese and U.S. analysts point out, there are special implications for the conventionalization of ballistic missiles in blurring the lines between conventional and nuclear attacks. For instance, could a conventional ASBM headed for an aircraft carrier be mistaken for a nuclear attack or an electromagnetic-pulse detonation? What would be the response? In fact, this is highly reminiscent of the contention over the Pentagon proposal mentioned above to use the Trident missile as a conventional weapon. The dual use of strategic ballistic missiles to carry both nuclear and conventional warheads, with their short kill chains and decision-making cycles, has profound implications for escalation control.
100. Andrew Erickson and David Yang, "On the Verge of a Game-Changer," U.S. Naval Institute *Proceedings* (May 2009).

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CLEAR PURPOSE, COMPREHENSIVE EXECUTION

Raymond Ames Spruance (1886–1969)

Captain Wayne P. Hughes, Jr., U.S. Navy (Retired)

As operational commander of hundreds of ships and aircraft, Admiral Raymond A. Spruance had the capacity to distill what he observed—and sometimes felt—into its essence and to focus on the important details by a mental synthesis. He would then charge his staff with comprehensive planning to achieve his purpose. Often the plan would be rent asunder, but it would retain its “tyranny of purpose”—roughly, the mission—as Spruance’s staff and commanders adapted to the circumstances. Although this seems always to have been the case from the battle of Midway to the extended battle of Okinawa, his first test, fought over Midway Island, foreshadows his wartime leadership. In part this is because we see his strategic acumen in the critical year of 1942; in part because we see his grasp of the decisive factors in the battle; in part because we see him as a “lucky” admiral; and in part, and not least, because the battle is well known and oft-studied.

What did Rear Admiral Spruance see and feel as he arrived on the station that Admiral Chester W. Nimitz had selected for his tiny, two-carrier Task Force (TF) 16? How did he deal with the disorganized staff he had inherited from Admiral William F. Halsey? What ran through his mind when Rear Admiral Frank Fletcher joined on 2 June and assumed command to execute the explicit plan Nimitz had detailed for Fletcher and Spruance just six days before? How did he deal with the disparate and inconsistent scouting reports? How did he team with his inherited aviator chief of staff, the difficult and sometimes overwrought Captain Miles Browning? What ran through his mind as he watched the cumbersome effort to dispatch the *Enterprise* and *Hornet* air wings in a compact pulse of power, the goal of every carrier commander but unachievable at this early stage of carrier warfare?¹

Imagine Spruance as he walks into Nimitz's office on 26 May 1942, only to be told that Halsey is hospitalized and Task Force 16 is his. Within minutes Spruance learns that in forty-eight hours he will sail to fight, with 100 percent certainty, the first naval battle of his life, outnumbered eighty ships to twenty-six, against an enemy who has not lost a battle since 7 December 1941. Nimitz says that his mission will be to take calculated risks to attack and punish the Japanese, yet without losing his own force.² Spruance learns that if *Yorktown's* damage at the battle of the Coral Sea can be patched up, Fletcher will join on the very eve of battle and assume tactical command. It is a mission demanding exquisite responsibility and adaptability. "Elated," says one historian of Spruance's reaction to the news. If you think like Spruance, "sobered" is a better term.³

The intricacy of the battle is instructive. Regarding Spruance's leadership, historians have paid excessive attention to whether it was Spruance or Browning who selected the moment to launch TF 16's portion of the decisive strike. In truth, Spruance expected the two to be a team. More important, the American and Japanese navies both had to solve extraordinary problems of carrier-deck management, the weight, range, and geographic direction of their scouting efforts, and the execution of a concentrated air attack—problems imperfectly solved on both sides but in the case of the Japanese fatally so. Each problem was multifaceted, and each in its own way was decisive.

Most important at the operational level was the cooperation between Nimitz, Fletcher, and Spruance. Spruance was entirely justified in his trust of Fletcher as tactical commander of TFs 16 and 17. Fletcher, in turn, had no hesitation in turning over tactical command to Spruance at 1800 (that is, six o'clock in the evening) on 4 June after his single carrier, *Yorktown*, was attacked and crippled. The outcome cannot be properly understood without recognizing that Nimitz, the theater commander, was on this occasion in effect his own tactical commander.⁴ Nimitz told his two subordinates where to position themselves northeast of Midway and passed on his best estimate of the timing of the Japanese attack. Nimitz specified the roles for TF 17 (to scout vigorously and act as a fighting reserve until it is clear that the Japanese carriers are not executing a two-pronged attack) and for TF 16 (be the cocked pistol, as a two-carrier striking force ready to dispatch an enormous pulse of power as soon as Admiral Chuichi Nagumo's carriers are within range). Nimitz directed the preliminaries because only his staff had the latest information from cryptanalysis; because he would have direct scouting reports from long-range PBY seaplanes and B-17 bombers; because he alone of the three could influence the attacks from, and defense of, Midway Island; and because TFs 16 and 17 had to keep radio silence until the Japanese discovered their presence.



Vice Admiral Raymond A. Spruance (center) ashore at Kwajalein, with Admiral Chester Nimitz (right), in February 1944

Photo courtesy of Naval Historical Center, Photo NH62233

Nimitz also told Fletcher not to combine in one formation but to keep two distinct dispositions. In 1942 this was wise. When *Enterprise* and *Hornet* launched their aircraft, Spruance's two carriers separated, the screen commander splitting his cruiser and destroyer escorts between them. Fletcher remained within visual communication of Spruance, but when the action started it was inevitable that the two formations would lose contact.

The great climax came just after the third wave of torpedo bombers, those under Lieutenant Commander L. E. Massey from *Yorktown*, sacrificed itself in another fruitless attack while *Yorktown* and *Enterprise* dive-bombers arrived overhead, simultaneously but inadvertently. At 1025 (10:25 AM) on 4 June, the American aircraft fatally damaged three Japanese carriers in ten minutes. It is well known that the three torpedo-bomber attacks brought the defending Japanese fighters down "on the deck" and so opened the door for the American SBD dive-bombers, but historian John B. Lundstrom's recent research uncovers the fact that the Imperial Japanese Navy's combat air patrol comprised *forty-one* fighters, *none* of which was in position to thwart the fatal dive-bomber attack.⁵ Many have said, correctly, that to win the Americans needed intelligence from cryptanalysis, astute leadership, great courage among the aviators, and just plain

luck. Another factor, scarcely noted in the histories, was the American radar advantage.⁶ Give Nagumo and his aviators the U.S. air-search radar, and most of the Japanese combat air patrol would have been at an altitude to break up the *Yorktown* (under Lieutenant Commander M. F. Leslie) and *Enterprise* (Lieutenant Commander C. W. McClusky) dive-bombers.

A final factor was also essential to the American victory. The island of Midway served like a fourth carrier. Because of code breaking, Midway Island's air element had been beefed up. The aircraft, about 125 of them, were a hodgepodge and did no damage whatsoever, but they occupied Nagumo's attention. The futile attacks kept the Japanese striking force busy while breeding overconfidence in its air defense. It was Midway Island and poor Japanese scouting that produced the chain of events that caught Nagumo's carriers loaded with armed and fueled aircraft. At 1020 on 4 June they were powder kegs waiting for the lighted American match. Midway, immobile but unsinkable, was the fatal attraction of the Japanese striking force.

Spruance emerged as the hero of Midway, and properly so. Yet later, when his authority grew—and he built his own team—so did his operational effectiveness, the comprehensiveness of his victories, and the swift pace his Fifth Fleet achieved as it drove through the Central Pacific. Strange to say, the sole decision at Midway that was unequivocally his and only his was one for which he was unjustly criticized at the time. That night, after finishing off Nagumo's fourth carrier in the afternoon, and against his staff's advice, Spruance withdrew to the east. He calculated that a Japanese surface force could reach him during the night if he headed west to chase the "withdrawing" enemy fleet. Critics immediately after the battle thought he had been too prudent. It wasn't until much later that it was discovered that Admiral Isoroku Yamamoto, commanding the Combined Fleet, had done just what Spruance feared he would do—try to compensate for Nagumo's dreadful defeat by sending a surface formation to meet the American fleet that everyone but Spruance thought should be driving west.

Immediately after Midway and for the next thirteen months, Spruance served as chief of staff to Nimitz, becoming conversant with Nimitz's campaign plan and watching the way he dealt with Admiral Ernest J. King and the Joint Chiefs of Staff in Washington, and with General Douglas MacArthur in the South West Pacific theater. Halsey had relieved Vice Admiral R. L. Ghormley, adding vigor to the Navy's support of the Guadalcanal operation. From afar, Spruance vicariously soaked up the tactical lessons of this pivotal campaign: the importance of reconnaissance, the rewards of coordinated land- and sea-based air operations, and the severe constraints imposed by operational logistics. As American industrial might took effect and King made his case that the primacy of Europe must

not preclude a vigorous offensive in the Pacific, Nimitz and King decided that Spruance was the leader best suited for the coming sweep across the Central Pacific. In August 1943 he was promoted to vice admiral, designated Commander, Central Pacific Force, and Commander, Fifth Fleet, charged with planning and executing the assault on the Gilberts in November 1943.

In Spruance we have an extraordinarily wide lens to study the rewards of sound leadership in a panoply of operational and strategic settings. Unlike at Midway, he could now assemble his own combat team. On one hand, Spruance was lucky in having had opportunities to identify promising subordinates well before the war. On the other, he did not hesitate to choose the talented, forceful, and opinionated ones, among them Carl Moore, Kelly Turner, and Holland Smith.⁷ He could quickly take the measure of other flag officers assigned to him, such as Marc Mitscher and Harry Hill.⁸ Also important, Spruance knew when to stay out of the often fierce confrontations of his subordinates, or when he had, usually with great reluctance, to intervene. Spruance's power to delegate effectively arose from his shrewd judgment of character.⁹

With his handpicked staff and volatile subordinates, Spruance and his Fifth Fleet began their rapid sweep across the Pacific. Each operation had its own characteristics: the first significant Marine assault, at Tarawa in the Gilberts in November 1943; the rapid seizure of the Marshalls in an efficiently run cakewalk; the neutralization with carrier air strikes and bypassing of the great Japanese bastion at Truk; and in June 1944 the difficult invasion of the well defended Marianas, along with the naval battle of the Philippine Sea. Halsey then took the fleet to Peleliu in September and the Philippines in October, after which Spruance returned to lead the cruel battle for Iwo Jima in February 1945 and the titanic two-month struggle for Okinawa two months later.

When Spruance took tactical command at Midway he never had more than twenty-six warships and 233 aircraft. Less than three years later, at Okinawa, he commanded over three hundred fighting ships with countless aircraft, 1,200 amphibious ships carrying 180,000 assault troops, and more than two hundred service-force vessels. Also present was a British contingent of twenty-two ships, including four carriers and two battleships.¹⁰

Raymond Ames Spruance was born on 3 July 1886 in Baltimore, Maryland. His maternal ancestors came from Maryland and New Jersey, but his father was from Indianapolis, Indiana. Thus, until he entered the Naval Academy in 1903, his early years were divided between the East and the Midwest. It is an indication of Spruance's aptitude that he had nominations to the academy from congressmen in both New Jersey and Indiana. The teenage Spruance wanted to accept the nomination from New Jersey, because he had placed first in a competitive

examination there, but to please his family he accepted the appointment from Indiana. One would have to interpret the influences of Spruance's childhood with too much hindsight to foresee his destiny in that episode, but it is fair to say that shyness, intelligence, and firmly held but thoroughly considered opinions were all evident from an early age.

The Naval Academy was expanding rapidly in those years to match the buildup of the Navy and accepted 266 plebes into his class of 1907. Spruance was to rank twenty-fifth among 209 surviving graduates. He would be one of the top third of his class who were graduated early, in July 1906, because the growing fleet needed career officers. Spruance reported first to *Iowa* but a year later was transferred to the new *Minnesota*, which was one of the sixteen ships of the Great White Fleet that circumnavigated the globe in 1907 and 1908.

What were the sources of Spruance's leadership? To begin with, his technical experience is understated by historians. In 1909, while still an ensign, he wangled a year at General Electric. His aptitude for electrical engineering having been recognized, he served in three engineer officer tours afloat and in three technical tours ashore, at Newport News Shipbuilding and Drydock, the New York Navy Yard, and the Bureau of Engineering.¹¹ In fact, Spruance found himself in danger of becoming a de facto engineering duty officer. Almost too late, Spruance fought his way back toward his first love, command at sea. But his knowledge of engineering and technology—for instance, in appreciating the operational potential and limitations of radar, IFF (Identification Friend or Foe), homing beacons, and the central role of combat information centers—were to be vital ingredients of his future success.

A second cornerstone was experience gained in two Naval War College staff tours. He would remember in the second one resisting Rear Admiral Edward C. Kalbfus's approach to education as too ritualistic. He told Kalbfus that his pet doctrinal publication, *Sound Military Decision*, was an elaborate cookbook of form over substance, in which an orderly process was veritably an end in itself rather than an aid to apprehending in all their dimensions the fullness and essence of an operation. Kalbfus neither lost respect for Spruance nor changed his mind.

The third cornerstone of Spruance's greatness was his experience as a commanding officer. He commanded six ships—the first, *Bainbridge*, while still a lieutenant (junior grade), and the last, *Mississippi*, at the time he was promoted to rear admiral, in December 1940. Spruance never ran aground or suffered a collision. Meanwhile, he won the respect of his peers, seniors, and juniors for operational competence. That he learned high-speed shiphandling under Commander William F. Halsey, his destroyer squadron commander, dispels any notion that Spruance was being too cool, too sure of himself, when as

commanding officer he would retire to his sea cabin with what his best biographer, Thomas B. Buell, seems to have regarded as excessive sangfroid.

Spruance believed his greatest value was as a strategist, though he never aspired to serve in Washington, D.C.¹² His leadership is significant both as a reminder that excellence in combat is the pinnacle of military achievement and in showing how a great leader grows quickly into each new role. No one transformed himself more *consciously* than Spruance, as he went from ship captain as late as December 1940; to flag officer subordinate to Halsey in the critical period immediately before and after Pearl Harbor; to task force commander, tactical commander, and chief of staff to Admiral Nimitz, all in June 1942; to vice admiral and Fifth Fleet commander in August 1943; and to admiral in February 1944, in command at the Marianas, Iwo Jima, and Okinawa. His flag lieutenant describes his first and most critical transformation, just before the battle of Midway. Literally overnight Spruance changed from a detail man—who, for example, “watched the chief signalman like a hawk” when he was Halsey’s screen commander—to a maker of major decisions, as Task Force 16 commander in *Enterprise*, where he “took himself out of the details completely.”¹³

Buell called Spruance “the quiet warrior,” but he was neither silent nor reticent. We know this because of a large and frank correspondence with his wife, Margaret, and with intimates like his former chief of staff and lifelong friend Captain Charles J. (Carl) Moore. We know it because Spruance communicated forcefully throughout his career, both in junior officer days and during his rapid wartime advancement. His views were esteemed by his juniors, his peers, and his seniors. With his staff he talked endlessly, often while walking back and forth on his flagship’s forecastle. Talking, he said, was how he shaped his thinking. Then he would disappear while his staff responded with thorough, detailed plans.

In communicating with seniors, Spruance restricted his issues to the few he thought were critical. His clearly expressed positions were not always accepted, nor was he always right, but from ensign to admiral he was listened to for wisdom and objectivity. Spruance’s unostentatious mode of communication compares well with that of the far more charismatic Horatio Nelson. Both leaders not only motivated their followers but instilled an extension of the mind of a master into what Nelson described as a “band of brothers.”

Admiral Ernest J. King considered Spruance to be “the most intelligent officer in the Navy,” but Spruance was not an intellectual.¹⁴ Rear Admiral E. M. Eller, then Director of Naval History, called him “self-possessed,” but Spruance was never self-sufficient.¹⁵ He was relentless but not vicious in his unflagging determination to defeat his talented, unyielding, and resourceful Japanese enemy. Nimitz said of him, “Admiral Spruance fought the war with his entire being.”

In response to those who said Spruance might have done better at Midway, at Tarawa, or in the battle of the Philippine Sea, Lundstrom says: “The constant was that every time Admiral Raymond A. Spruance commanded an operation against the Japanese, they lost.”¹⁶ He never let the Japanese navy, army, or kamikazes, or the weather, or logistics defeat him, even under the direst circumstances. Naval War College historian and strategist George Baer offers that Spruance “perfectly characterizes Clausewitz’ notion of military genius.”¹⁷

Illustrative is Spruance’s execution as Fifth Fleet commander at the battle of the Philippine Sea. Some later thought he was too cautious because he protected the beachhead on Saipan. He had positioned his fighting fleet within easy reach of it, because he knew the Japanese propensity to split their forces in previous attacks. He believed they might draw the American fast carriers and battleships toward the west with one force while sneaking in with the other to crush the beachhead. Four months later, this was in fact the Imperial Japanese Navy’s plan: it drew away the more impetuous Admiral Halsey and his Third Fleet (the same ships with a different commander) in the battle of Leyte Gulf.

Spruance hugged the beachhead, as Admiral Ozawa Jisaburo expected him to do. With a flank attack foreclosed, the Japanese admiral conceived a perfectly sound plan, which was to launch all his strike aircraft, 450 of them, from the west and well beyond the range of the Americans. He could do that because his aircraft would not have to return to their carriers, as an American strike would; instead, they would cripple the U.S. carriers and then fly on eastward to Japanese airfields in the Marianas, from which they would then reattack. Simultaneously, substantial land-based naval air forces would attack the Fifth Fleet from Guam and Saipan, in the Marianas, reminiscent of our own attacks on the Japanese carriers from Midway Island.

The Japanese plan might have been effective in June 1942, but it could not be in June 1944. Task Force 58 had already destroyed all Japanese airpower in the Marianas and established air supremacy. By thinking defensively—a scandalously poor strategy in 1942 but perfect for 1944—Spruance empowered Mitscher to assemble *all* his fighters for defense. Nor did Mitscher need to deal with decks cluttered with armed and fueled dive-bombers and torpedo bombers. Task Force 58 struck those aircraft below and concentrated on mounting a defense so formidable that it used more fighters on hand than the Japanese had in total aircraft for the attack. The American defense comprised fifteen fast carriers in four tight formations ringed by cruisers and destroyers carrying scores of antiaircraft weapons. The ships shot down or drove away the trickle of bombers not destroyed by the American combat air patrol. The few Japanese aircraft that survived and flew to the Marianas had no place to land and were destroyed. This was the famous “Marianas Turkey Shoot,” in which 435 of 450 Japanese

aircraft were destroyed at the cost of thirty American fighters.¹⁸ By 1944 the Pacific air war had been transformed from a battle to destroy air *bases* afloat and ashore into a battle to destroy *aircraft* in the air and on the ground.

In the Philippine Sea Spruance vacillated between staying close and steaming west in an attempt to attack effectively first, as Mitscher fervently begged him to do. Spruance chose the right course of action, and in so doing he won the most decisive battle in the history of naval air warfare, Midway not excepted. The Japanese carriers never recovered and were thereafter floating airfields without aircraft. The result was kamikaze attacks for the rest of the war.

Spruance had to an extraordinary degree the mental equivalent of peripheral vision. Not only did he visualize the situation he confronted in 360 degrees, but he did so in *n* dimensions—that is, in all aspects. When Spruance was in his sixth shipboard command, just before promotion to rear admiral, a lieutenant with whom he had once had theological discussions was officer of the deck (OOD), “conning *Mississippi* through complicated maneuvers in company with other battleships.” Spruance calmly said, “Tell me more about reincarnation, evolution, and karma.” The hapless OOD was sure that he had to safeguard the ship from an absentminded skipper. To the contrary, it is safe to say that Spruance was testing the young officer’s mental capacity to address two problems at once. While grilling the OOD, Spruance, with his “peripheral vision,” would not only have seen everything going on around them but anticipated anything that might happen.¹⁹ On another occasion, in January 1939, a Panama Canal pilot gave a logical order, right rudder, but the idiosyncratic *Mississippi* swung left toward shoal water and a moored dredge. Spruance took the conn from the pilot and saved his ship.²⁰

With the war over, after brief tours as Commander, Naval Forces Japan, and Pacific Fleet commander, in March 1946 Spruance returned to the Naval War College as President. He emphasized two things. First, he wanted to enhance officer *education* in operations and strategy. Spruance accepted that planning needs a process—something less tendentious than the one Kalbfus had espoused—but he thought that beyond process, and more important, come comprehensive thinking and clarity of purpose. For example, doctrine said you win command of the sea before exploiting it with an amphibious operation, but Spruance would have seen this as a trap of theory, because in his experience a practical enemy would not come and fight until the landing had taken place and the opposing fleet was tied to a beachhead.

Second, Spruance introduced operational logistics to the curriculum. He had first seen the dominance of logistics at Guadalcanal, lived logistics from Tarawa to Okinawa, and suffered its restraints in the summer of 1945 when he was planning, with profound reluctance, the invasion of Japan scheduled for November.

Spruance knew from personal experience that the prewar plan to construct advance bases across the Pacific had been a cumbersome failure and that a key to his bold sweep through the Central Pacific had been the act of collective genius embodied in the mobile logistics support force that followed on the heels of his fleet wherever it went. Indeed, the Pacific campaign had been governed by resource allocations, between the European and Pacific theaters and, in the Pacific, between Nimitz and MacArthur. Spruance could contrast from firsthand experience the extraordinary success of the U.S. Navy's logistical support with the ever more devastating logistical frustrations suffered by the Japanese army and navy from 1943 onward.

Spruance was only partially successful at the Naval War College. Educating military officers in how to shift from following orders to creating them proved to be no easy task. Persuading future leaders that logistics dominate operations—and even strategy—was a challenge that is still with us over sixty years later.

The best way to understand Spruance's leadership is not to show how he followed doctrine, principles, or an elaborate process, for as we have seen he did not. His four major attributes were luck, ambition, skills acquired from study and experience, and innate talent.

Napoleon said he wanted only lucky generals. Branch Rickey once said (of baseball), "Luck is nothing more than the residue of design."²¹ In these terms, Spruance was lucky. We know the Midway story and why he was a "lucky general" in his first battle. Halsey insisted on Spruance as his replacement because he knew him intimately. Nimitz thought his calm demeanor and "peripheral vision" were what would be needed in the crucial battle. Luck played in the decisive dive-bomber attack at 1025 on 4 June, but mutual confidence between Nimitz, Fletcher, and Spruance had established the conditions fulfilled by the courageous American pilots. Good luck entered in when the Bureau of Navigation ordered fledgling Rear Admiral Spruance to the Pacific in mid-1941—and the bureau chief was Chester Nimitz. Nimitz gave Spruance a cruiser division. Spruance was keenly disappointed that he did not get a battleship division. As luck would have it, his cruiser division was assigned to Halsey. In this way Spruance had six months to understudy carrier operations in the direst circumstances, while escaping the inconsequentiality of battleships in 1942. Nimitz for his part had no way of knowing when he gave Spruance his vital assignment that he himself would soon replace Admiral Husband E. Kimmel as Pacific fleet commander and that Spruance would become his most valuable subordinate.

What of Spruance's desire to achieve? Self-serving ambition is characterized by forcefulness, even ruthlessness, in advancing one's own interest. Spruance

was just as forceful, and it is fair to say ruthless, in his prosecution of the war, but he prosecuted it selflessly. His ambition was for the success of his forces, his navy, and his country. Selfless ambition entails an extra measure of talent, both your own and that of the subordinates you choose. When Rear Admiral Arthur Davis, an aviator, took over as chief of staff from Carl Moore during the Fifth Fleet staff's brief respite in the last half of 1944, he made it his task to unburden Spruance of concern for the detailed planning both knew would be their recipe for success at Iwo Jima and Okinawa. Buell said, "Davis was awed by Spruance's intellect and regarded the admiral as modest, shy, unassuming, and unconceited." Davis later wrote, "I made up my mind I would do all in my power to keep his mind free of all the deadening inconsequentialities that can waste time and take attention from the things that really matter."²² The historian Samuel Eliot Morison thought "Spreuance's leading characteristics were attention to detail, poise, and the power of intelligent decision." Yet Spruance appraised himself late in life differently: "When I look at myself objectively, I think that what success I may have achieved through life is largely due to the fact that I am a good judge of men, I am lazy, and I never have done things myself that I could get someone to do for me."²³ There is no contradiction between Morison's admiration of Spruance's "attention to detail" and the latter's self-evaluation "I am lazy"—keeping in mind Spruance's knack of propitious delegation, accompanied by his comprehensive, *n*-dimensional peripheral vision. Spruance was prudent but not cautious in formulating and executing operations.

Spruance's early education and experience have been addressed. A Naval Academy foundation, student and two staff tours at the Naval War College, and technical training at General Electric gave him a well rounded education. Six tours in engineering billets and six commands gave him well rounded operational experience. An indication of his professional temperament is that, serving under his fair share of good and mediocre leaders, he seems to have won the respect of them all.

As to Raymond Spruance's inherited characteristics, one must regard his famous reserve as innate, as well as his selfless desire for excellence. These characteristics were seen and remarked on even when he was an ensign and were the foundations of the universal respect in which he was to be held. Spruance embodied both shyness and stoicism. Probably in the early days shyness predominated, but as the war grew progressively bloodier, stoicism would help him keep focused on his command responsibilities. Those who knew him best say his eyes gave away his sense of humor and sensitivity but he kept those traits concealed under a grave demeanor. He was famous for preserving his energy. The emotionally draining two-month campaign for Okinawa exhausted his staff and ships'

companies, yet his flag secretary, Charles Barber, later insisted that Spruance looked as fresh at the end of the campaign as the day it started.²⁴

His natural proclivities were not unerring. For example, after taking Tarawa in the Gilberts in November 1943, he did not want to go directly at Kwajalein in the heart of the Marshall Islands but argued for taking the outer atolls first. Nimitz, however, thought the Japanese would not have time to build up their defenses if he struck quickly. Two months later Nimitz was proved right when Spruance took Kwajalein against light opposition.

Spruance's most important leadership trait seems to have been inherent rather than acquired. On one hand, he had very high standards of *effectiveness*, for himself and everyone he esteemed. On the other hand, he expected no one, including himself, to perform flawlessly. Spruance believed that a goal of perfection stifles timely decisions and inhibits the pace of action, whether in himself, his staff, his subordinates, or his peers. He had low regard for anyone who when judging effectiveness could not distinguish molehills from mountains. This trait shines like a beacon in everything he wrote, said, and did. Morison perhaps best summed up Raymond Ames Spruance: "He envied no man, regarded no one as rival, won the respect of all with whom he came in contact, and went ahead in his quiet way winning victories for his country."²⁵

NOTES

1. Depending on your capacity for empathy you may approach an understanding of the battle after reading, say, the chapters on Midway in Herman Wouk's *War and Remembrance*, John Lundstrom's recent three-chapter account of the battle in *Black Shoe Carrier Admiral*, and the early but still masterful narrative in Samuel Eliot Morison's *History of United States Naval Operations in World War II*.
2. His flag lieutenant said Spruance told him after being briefed by Nimitz: "It appears . . . I have two sets of orders. [First] a written order to meet and defeat the Japs. [Second] My oral orders are not to lose my force. If things go badly I am to withdraw and let them have the place because they can't hold it and we will get it back." Robert J. Oliver, letter, 5 August 1971, Naval War College Historical Collection, Spruance Papers [hereafter Spruance Papers], MS 37, box 3, folder 12.
3. This despite correspondence with E. P. Forrestel, 19 December 1962, in which Spruance wrote, "Needless to say, I was very pleased." Spruance Papers, MS 37, box 3, folder 4.
4. For a more thorough treatment, see Hughes, "Naval Tactics and Their Influence on Strategy," *Naval War College Review* 39, no. 1 (January–February 1986), pp. 2–17.
5. J. B. Lundstrom, *Black Shoe Carrier Admiral: Frank Jack Fletcher at Coral Sea, Midway, and Guadalcanal* (Annapolis, Md.: Naval Institute Press, 2007), p. 260.
6. A recent book does so very well, however, and in great detail: Jonathan Parshall and Anthony Tully, *Shattered Sword: The Untold Story of the Battle of Midway* (Washington, D.C.: Potomac Books, 2005), for example, pp. 137, 186.
7. Rear Adm. Carl Moore was Spruance's chief of staff in 1944; Vice Adm. Richmond Kelly Turner was to command Amphibious Force, South Pacific Force; Lt. Gen. Holland M.

- Smith, USMC, commanded V Amphibious Corps in the Central Pacific.
8. Vice Adm. Marc Andrew Mitscher commanded the Fast Carrier Strike Force, and Rear Adm. Harry W. Hill amphibious forces, both in the Central Pacific campaign. Mitscher did not live up to Spruance's expectations as commanding officer of USS *Hornet* at Midway. Not until after Task Force 58's air strikes to neutralize Truk in early 1944 did Mitscher earn Spruance's full confidence.
 9. Buell, Spruance's best biographer, reports only one instance in Spruance's six warship commands when a subordinate took advantage of his trust, and that was not an operational matter but an administrative one, involving the petty theft of provisions. Thomas B. Buell, *The Quiet Warrior* (Annapolis, Md.: Naval Institute Press, 1987), pp. 74–75.
 10. Ibid., chap. 22. Also see E. P. Forrestel, *Admiral Raymond A. Spruance, USN: A Study in Command* (Washington, D.C.: U.S. Government Printing Office, 1966), chap. 15. Forrestel, who had served on Spruance's staff in the Pacific, takes a less personal approach than Buell.
 11. His afloat engineer-officer tours were in USS *Connecticut*, USS *Cincinnati*, and USS *Pennsylvania*.
 12. Spruance's two theses on command and policy, written when he was a student in 1927 and today in the archives at the Naval War College, are ample evidence that he had the talent of a great strategist. The first deserves to be republished today for its concise description of command responsibilities. He designed organizational relationships for a proper "Navy general staff" in a way that one might wish were in effect today. Both exemplify his crisp, clear, concise style of thinking.
 13. Oliver letter.
 14. Buell, *Quiet Warrior*. To ease his mind under pressure Spruance read detective stories and the like, but never the great classics.
 15. E. M. Eller, introduction, in Forrestel, *Admiral Raymond A. Spruance, USN*, p. viii.
 16. J. B. Lundstrom, introduction, in Buell, *Quiet Warrior*, p. xvii.
 17. George Baer, personal correspondence to Hughes, 17 April 2007.
 18. Late in the afternoon Mitscher persuaded Spruance to send a strike. The fleeing Japanese ships were at the extreme attack range of three hundred miles. Most of the American aircraft lost that day, a hundred of the 216 Mitscher dispatched, ran out of fuel and had to land in the water.
 19. Buell, *Quiet Warrior*, p. 38.
 20. Ibid., pp. 89–90. To stop the strange swing to port, Spruance dropped and held the starboard anchor while backing full the starboard engines.
 21. Quoted in a review of *Rickey, Baseball's Feroocious Gentleman*, by Lee Lowenfish, *Weekly Standard*, 9 April 2007, p. 38.
 22. Buell, *Quiet Warrior*, p. 338.
 23. Ibid.
 24. C. F. Barber, oral history, 1 March 1966, Spruance Papers, series II, box 17.
 25. Samuel Eliot Morison, *History of United States Naval Operations in World War II*, vol. 3, *New Guinea and the Marianas: March 1944–August 1944* (Boston: Little, Brown, 1953), pp. 235–36.



MIDWAY AND THE INDIAN OCEAN

Jeremy Black

While we are at war with Germany and Italy we do not possess the naval resources necessary to maintain the command of the Indian Ocean against any heavy detachment from the main Japanese fleet.

WINSTON CHURCHILL

Winston Churchill's remark to the Secret Session of the House of Commons on 23 April 1942 provides the key to this article, an attempt to focus on the strategic significance of Midway.¹

American victory at Midway may well be a self-evident proposition to Americans and others contemplating the course and significance of the struggle between America and Japan between 1941 and 1945 for dominance of the Pacific. Yet that struggle does not exhaust the importance of that battle, and it particularly behooves a non-American to comment on the wider significance of Midway. Such a task could be profitably repeated for other battles seen as turning points, notably Stalingrad, El Alamein, the Atlantic convoy battles of the spring of 1943, and Kohima (in northeastern India in April 1944, where British and In-

dian forces repulsed the Japanese). Each is too readily approached in terms of the particular combatants who fought the battle, with a tendency to underplay its wider significance.

As far as Midway is concerned, my general perspective is the issue of the prospects for, and success of, coalition warfare during the Second World War, and my specific concern is serious British weakness in the Indian Ocean region. Coalition warfare faces problems and creates irritations, but it can also be a crucial force multiplier. In the Second World War, the Allies confronted multiple issues, both political and military, in

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pursuing coalition warfare. A coalition that included Joseph Stalin, Chiang Kai-shek, and Charles de Gaulle was scarcely going to be easy, and alongside the inherited distrusts and special interests that they represented, there were also serious problems in Anglo-American relations, both political and military. Indeed, there is a rich literature on the subject.²

In contrast, there is no such extensive literature on the deficiencies of Axis coalition warfare, and this is appropriate, because despite the extent to which the totalitarian regimes of the Axis had more in common than the Allies, they failed as an effective alliance.³ In particular, the two leading Axis powers, Germany and Japan, were unable to create a military partnership, nor to provide mutual economic assistance that in any way matched that of the Allies, strained as relations among the latter were. German and Italian submarines were to link up in the Indian Ocean with the Japanese, but they did not mount any large-scale concerted operations.⁴ German plans for war with the United States made little of the prospect of Japanese assistance and preferred to focus on the possibility of using naval power and, subsequently, when that ceased to be even remotely plausible, on the prospect of “wonder weapons.”⁵

Germany and Japan indeed fought what were in essence two separate wars, and there was little in the way of coordination or cooperation between them, and still less between Italy and Japan. In Eritrea, Italy had a colony on the Red Sea, with a port at Massawa, where destroyers were based, and, in Somalia, another on the Indian Ocean, with a port at Mogadishu; both, however, were conquered by the British before there was any prospect of cooperation. Mogadishu was captured by a force from Kenya on 25 February 1941, Massawa following on 8 April, falling to a force from Sudan, while Berbera in British Somaliland, which the Italians had conquered in August 1940, was recaptured on 16 March 1941 by a force from Aden, in an amphibious operation.

The Italian navy was large and modern and included six battleships, nineteen cruisers, and 113 submarines, although no aircraft carriers. This fleet, however, was largely confined to the Mediterranean, although Italian submarines took part in the Battle of the Atlantic from 1941. With the British in control of Egypt, the Italians were in no shape to intervene in the Indian Ocean, irrespective of the problems posed by a lack of fuel, air cover, or determined leadership.

The high point of German-Japanese coordination was Germany's decision to declare war on the United States after Pearl Harbor, an attack Hitler had sought to encourage by pressing forward military operations against Moscow. This declaration of war, however, was essentially the product of the deterioration in American-German relations, rather than a means to assist Japan;⁶ the declaration of war did not lead to any concerted attempt at grand strategy.

The only sphere in which such an attempt might have been possible was the Indian Ocean, with German pressure on the Middle East interacting with Japanese advances on India and in the Indian Ocean. British policy makers, indeed, feared joint pressure in the form, for example, of a possible German advance through Turkey, prior to the launching of Operation BARBAROSSA, or, subsequently, through the Caucasus.

These concerns were a second tranche of earlier fears about the Germans exploiting support in Iraq and (Vichy) Syria, as they had sought to do. This had led to the British invasion of both in the summer of 1941.

The fears of an advance through Turkey did not materialize. The Germans did not invade, and had they done so, they would have found the Turkish army capable of mounting a formidable resistance. Moreover, any advance through Turkey would have encountered serious logistical and transport limitations and problems. Pressuring Turkey into granting transit rights would have been a difficult question, but the situation would have had to be more dire for such pressure to succeed.

In the event, the planned German advance to the Azerbaijani oil fields near Baku in late 1942 was thwarted by Soviet resistance and by Hitler's focus on the capture of Stalingrad. By then, anyway, the British and Soviets had occupied Iran (from 25 August), capturing Tehran on 17 September. Persia provided a crucial route for Lend-Lease supplies to the Soviet Union, as well as giving British India considerable defense in depth in the event of German success in the Caucasus or the Middle East.

In practice, the German threat to the Indian Ocean came most directly via Egypt. The Germans had driven back the British in Libya in 1941, and, having been forced to fall back in November 1941, returned to the offensive in early 1942. On 20 June 1942, following the German success in the battle of Gazala, the key Libyan port of Tobruk, a forward defense for Egypt, fell, and the Afrika Corps then advanced into Egypt. In July and September, however, Erwin Rommel tried and failed to break through the British defenses in order to advance on Alexandria and the Suez Canal. The German advance created considerable pressure and led to an atmosphere of crisis, as well as to the departure of the Mediterranean fleet from Alexandria. Yet the attacks were held, while the pro-British ministry in Egypt kept the significant Axis elements that existed there at bay.

As a consequence, the Axis threat to the Indian Ocean region came from Japan. This region was crucial to a number of strands in the Allied war effort. Via the Indian Ocean came Allied aid to both China and the Soviet Union, as well as oil from the Middle East. The Indian Ocean was also central to the defense of Egypt and the Middle East, as well as to the articulation of the British imperial

system, notably the deployment of Indian, Australasian, and South African forces. Indeed, in his *Rulers of the Indian Ocean* (1927), Admiral George A. Ballard noted:

As regards its present form or fabric the Empire may be roughly divided into an occidental half—including the British Isles—and an oriental; which are held together commercially and strategically by the Imperial lines of communication across the Indian Ocean; the whole being kept in contact with foreign lands throughout the East by the trade routes traversing the same water-space. If those connections are cut, the two halves of the Empire will fall apart as surely as night follows day.⁷

Born in India, Ballard (1862–1948) was a product of empire, who had served in Sudanese (1884), Burmese (1885–86), and Chinese (1900) waters, as well as being director of the Operations Division of the Admiralty War Staff.

The vulnerability of the British Empire to Japanese attack had been a major theme in prewar planning and had led, in particular, to the scheme for the development of a major naval base in Singapore. As early as 1919 an Admiralty memorandum had warned that the Royal Navy was likely to be weaker than that of Japan in the Far East. It suggested that using Hong Kong as a base would expose the fleet and that instead Singapore should be developed, as it was sufficiently far from Japan to permit reinforcement without peril.⁸

By the 1930s, the British planned to send a major fleet to Singapore in the event of war with Japan.⁹ In 1940, however, the naval situation deteriorated sharply. Germany's victory over France took the latter's navy out of the Allied camp, greatly increasing British vulnerability. This issue was greatly exacerbated by Italy's entry into the war in June 1940, which exposed Britain's position in the Mediterranean. The establishment of forward submarine bases in the German conquests of Norway and France made Britain's Atlantic supply routes far more exposed than in the First World War. In 1941, the Royal Navy took heavy losses in the Mediterranean and the Atlantic. In such circumstances, it was unsurprising that the First Sea Lord complained in September 1941 of a shortage of cruisers, adding that "the destroyer situation is even worse," when explaining why he could send none to the Far East.¹⁰

Concerned about the war with Germany, the British mistakenly hoped that the defense of Malaya and Singapore would benefit from the strength of the American fleet in the western Pacific, and they also seriously mishandled their own naval units in the face of Japanese airpower. A powerful squadron, though without any carriers (due to the damage suffered by the intended one), was sent from Singapore to contest the Japanese landings in Malaya, but on 10 December Japanese land-based naval bombers sank the key units, the battleship *Prince of Wales* and the battle cruiser *Repulse*. These were the first ships of these types

sunk in open sea solely by air attack, and their loss demonstrated the vulnerability of capital ships without air cover against air attack. The poorly conceived and executed plan of the force commander, Sir Tom Phillips, also reflected wider issues, including deficiencies in air-sea coordination.¹¹

Two months later, in the battle of the Java Sea (27 February–1 March), Allied naval forces unsuccessfully attacked a Japanese fleet en route to Java. The Japanese fleet was well coordinated, enjoyed superior air support, and benefited from better torpedoes; for their part, the American, Australian, British, and Dutch warships lacked an able commander and experience of fighting together. The Allied fleet was destroyed.

By then, Singapore had fallen to Japan (on 15 February), followed on 8 March by Rangoon in Burma. With their conquest of Malaya, Singapore, Sumatra, and Burma, the Japanese were best placed to advance into the Indian Ocean region, where indeed they occupied the Andaman and Nicobar islands in March, which had been evacuated by the British.

In April, the Japanese under Vice Admiral Chuichi Nagumo, with five carriers and three hundred planes, launched an expedition into the Indian Ocean. The main Japanese strike force advanced to the south of Ceylon, raiding the port of Colombo, sinking a destroyer, and downing twenty-seven British aircraft for nine of their own. On the 5th, at 1:55 in the afternoon, the Japanese also sank two British heavy cruisers, *Devonshire* and *Cornwall*, to the southwest of Ceylon. Nagumo followed on 9 April by an advance to the east of Ceylon, from which a raid was launched against the key naval base of Trincomalee. Caught at sea, the small carrier *Hermes* and the Australian destroyer *Vampire* were sunk at nine o'clock that morning. (Commissioned in 1924, *Hermes* had a tonnage of only 9,765 and an overall length of 181.8 meters, not quite six hundred feet, and carried only twenty-five aircraft.) The Japanese then withdrew.

A separate squadron—Malaya Force, under Vice Admiral Jisaburo Ozawa—sailed from Mergui, in southern Burma, steaming west between the Andaman Islands and the Nicobars. On 6 April, from off the coast of eastern India, Ozawa launched raids on the ports of Cocanada and Vizagapatan and attacked shipping in the Bay of Bengal, sinking twenty-three merchant ships, twenty in one day. (Ozawa had been in operational control when the British warships were sunk on 10 December 1941 and was to go on to command the First Mobile Fleet during the battle of the Philippine Sea in 1944.) In addition, in April 1942, off India's west coast, Japanese submarines sank thirty-two thousand tons of shipping.

The British Eastern Fleet, under Admiral Somerville, was a considerable force, with three carriers (two of them new), five old battleships, and five cruisers, but the Japanese attack had come when it was off its cruising area south of

Ceylon, to refuel and rewater at Addu Atoll in the distant southern Maldives. The warships sunk by the Japanese had been sent to Ceylon for repair and escort duties, and their loss made Somerville uneasily aware of his weakness. He correctly thought that his carrier aircraft were unable to compete with the more numerous and better Japanese aircraft and that this deficiency left the battleships vulnerable. As a result, Somerville sent the battleships to Mombasa, in Kenya.

Had the Japanese been able to establish a permanent naval presence in the Indian Ocean, they would have threatened not only the British position in India but also that in the Middle East, challenging Britain's oil supplies from the Persian Gulf and its routes to Australia. The buildup of Ceylon's garrison to a strength of two divisions by the close of March 1942 was a response. As there was to be no Japanese landing, this force was not tested, and it is easy for historians, when space is at a premium, to ignore such moves. However, they throw light on strategic preferences. The troops deployed in Ceylon could not be sent to protect India against an advance from Burma, as Field Marshal Wavell, the commander in chief in India, wished; also, the decision reflected the determination of the Chiefs of Staff to maintain oceanic links. Had the Japanese landed an invasion force on Ceylon, it is difficult to see why they should not have repeated earlier successes: British fighting quality was no stronger, although the civilian population was resolved to resist the Japanese. In his war diary, Admiral Sir Geoffrey Layton, Commander in Chief Ceylon, noted, "Ceylon, on my arrival there on 21st January [1942], was virtually defenceless. . . . [T]he problem of retaining control of the coastal waters of Burma was quite beyond our powers in the absence of either air superiority or fast patrol craft with good AA [antiaircraft] armament so numerous that we could afford substantial losses."¹²

The Japanese advance forced Somerville to think about the need to protect the Arabian Sea, and thus tanker sailings from the Persian Gulf, as well as the routes from both the Gulf and the Red Sea down the coast of East Africa to the Cape of Good Hope. This was done by withdrawing the fleet to Bombay (modern Mumbai) and Mombasa, which seemed advisable not least as the main Japanese fleet, without a base in Ceylon, was forced to rely on distant Singapore. Nevertheless, there was acute concern about the security of Ceylon, even of the whole of India. The navy was no longer in a posture of forward defense and, crucially, was unable to prevent an invasion. As there was no effective air cover to protect India, the situation appeared more dire than that facing Britain in 1940 when threatened by German invasion.

In response, the British were encouraged to press forward their plan to seize Madagascar from Vichy French forces. In March, intercepts had indicated that Germany was urging Japan to occupy the island, and the British feared the basing of Japanese submarines there. On 5 May, the main port of Diégo Suarez was

attacked; its defenders surrendered on 7 May, although additional operations from September were necessary to achieve the island's final surrender on 5 November. This was Britain's first major amphibious success of the war.

The fate of Madagascar was indicative of that of Ceylon, as air superiority supplied by two carriers was important to British success at Diégo Suarez, the British being faced by no significant airpower on the part of Vichy, and certainly by no carrier. The crisis ended with most of the Japanese warships' being deployed for the attack on Port Moresby planned for early May, the attack that was to lead to the battle of the Coral Sea.

The Japanese raid into the Indian Ocean is not only one of the great counterfactuals (what-ifs) of the war but also a key indication of the importance of Midway. There was a greater vulnerability in the Indian Ocean than that of the United States in the far larger Pacific. Instead, however, of pursuing their potent advantage against the secondary enemy and possibly preempting the invasion of Madagascar and crippling British oil movements, the Japanese sent their carriers into the Pacific theater against their strongest opponent. Of course, had the Japanese concentrated on the Pacific theater throughout and not launched the raid into the Indian Ocean at all, they might have been in a better position to exploit their initial advantage in the Pacific, not least by putting pressure on the remainder of the American Pacific Fleet.

As it was, four of the carriers Nagumo had taken into the Indian Ocean were destroyed at Midway. This defeat led the Japanese to postpone their plans to advance in the southwest Pacific, toward New Caledonia, Fiji, and Samoa. Losses at Midway also reduced Japanese strategic options for future campaigns in the Indian Ocean, while also making it less dangerous for the Americans to prepare to mount attacks in the Pacific, which in turn further reduced Japanese options in the Indian Ocean.

After Midway, the Japanese still had a large navy that was particularly strong in battleships, cruisers, and destroyers. Yet their losses in 1942 cost the Japanese their lead in carrier strength, and by the spring of 1943 only one fleet carrier (as against light carriers) was prepared for conflict. The others were damaged. Three more fleet carriers were due for completion that year, but the Americans were planning or building far more. There was also a major disparity as far as cruisers, destroyers, and submarines were concerned.

The marked difference in industrial capability and effective war mobilization of the two powers was readily apparent, and this difference was to be accentuated by naval action. Whereas the Japanese navy could not strike at the American economy, the inroads of American submarines greatly affected the movement of raw materials to Japan and, therefore, its industrial capability.

The contrast between the two economies was also seen in the construction of merchant shipping, in which the Americans opened up a massive lead.

As a result, they could attack with greater safety. Off the island of Guadalcanal in the southwest Pacific, from August 1942 to February 1943, there was a struggle for the naval dominance correctly seen as crucial to the struggle there on shore. In the battle of the Santa Cruz Islands on 26 October 1942, a strong Japanese fleet, including four carriers, attacked an American fleet containing only two carriers, and the Americans lost one of them. However, the heavier loss of Japanese aircraft and, even more important, aircrew was a major blow. From mid-November, however, the Americans were successful in defeating the Japanese off Guadalcanal.

Thanks to Midway, and the war in the Pacific generally, the British were obliged to deploy only limited naval strength against Japan until the closing year of the war. The total Japanese concentration on the Pacific from May 1942 ensured that there were no more raids into the Indian Ocean, and no British warship was lost there in 1943. Instead, the British fleet focused on the Mediterranean and the Atlantic, notably in supporting the invasion of Italy in 1943. Whereas the British had had two carriers to cover the attack on Madagascar in May 1942, from January 1943 there were none in the Indian Ocean until October, when an escort carrier arrived. In turn, after D-Day, Britain was able to transfer much of its navy to take part in the war with Japan.

This contribution looked toward Britain's subsequent naval cooperation with the United States, both in NATO, which was to be created in 1949, and during the Korean War (1950–53). The Indian Ocean remained a key area of British naval activity and leadership until Britain's withdrawal from "East of Suez" from the late 1960s, but this presence was dependent on the extent to which alliance with the United States covered British maritime interests in the Atlantic and the Mediterranean. Similarly, the British naval position in the Indian Ocean helped the Americans to focus on the Pacific.

Midway therefore can be understood as a crucial episode in the geopolitics of the war and as a vital contribution to coalition politics and warfare. It was of a part with the movement of American fighters to northern Australia from 17 March; the battle of the Coral Sea (7–8 May) helped strengthen the defense of Australia, but in the meantime there had been plans to abandon the north and to focus on defending a line north of Brisbane.

As Churchill was the first to note, American support for the continuation of the British Empire was limited and conditional. Yet, even if indirect, it could be crucial. Once the empire was gone and Britain's position in South Asia changed dramatically with Indian independence in 1947, it became difficult to think back to the geopolitics of the situation, let alone to appreciate the value of India

to Britain and others. The United States and the Soviet Union would probably have defeated the Axis even had the situation in India and the Indian Ocean become far worse, but Britain, understood as the British Empire, would have been able to contribute far less. Moreover, the possible domino effect on the Pacific War of a weakening of the Chinese position as a result of greater instability in India is worthy of contemplation. The Americans would have had to focus on air attacks on Japan from the Pacific rather than, as originally, from China.

These points serve as a reminder of the degree to which strategy involves an understanding of the relationships between different spheres of operation and the associated prioritization of tasks and commitments. The Axis powers proved deficient in such understanding compared to the Allies, although the latter faced grave difficulties in trying to manage their responses to these relationships.

Counterfactualism, the what-ifs of history, has a bad academic press.¹³ Let me therefore close with entries from the diary of General Sir Alan Brooke, the chief of the Imperial General Staff, to remind us of the sense of threat felt at the highest level of British decision making. For 6 April 1942:

On reaching COS [the Chiefs of Staff Committee] I discovered that most of the Japanese fleet appeared to be in the Indian Ocean and our Eastern Fleet retiring westward. Up to present no signs of transports. I don't like the situation much as we are very weak in the Indian Ocean. I have been trying to get First Sea Lord to fix up with the Americans some counter move toward Japan to cover this very predicament that we are in, but he has failed to do so up to present.¹⁴

Brooke was even gloomier next day: "COS at which we looked into the unpleasant situation created by entrance of Japanese fleet into Indian Ocean. Just what I had been afraid of and had been trying to get First Sea Lord busy about during whole of last week. Also frantic calls for air support from Wavell, which according to Portal there is little chance of meeting. I suppose this Empire has never been in such a precarious position throughout its history!"

On 10 April, he added, "Usual COS meeting, mainly concerned in trying to save India from the Japs. A gloomy prospect with loss of command of sea and air."¹⁵

NOTES

I benefited from the opportunity to deliver an earlier version of this as the Naval War College Midway Lecture in 2009 and to a meeting of the Naval Order of the United States at Newport, Rhode Island, as well as

from the comments of Captain Stan Carpenter, USN.

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FRESH THINKING FOR AN OLD PROBLEM

Report of the Naval War College Workshop on Countering Maritime Piracy

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The problem of maritime piracy off the coast of Somalia has escalated over the past year, beginning with the seizure of the very large crude carrier *Sirius Star* in November 2008. The supertanker was carrying two million barrels of oil, and a ransom of three million dollars was paid for the release of the \$100 million cargo and the twenty-five crew members being held hostage. The *Sirius Star* motivated a number of important international initiatives to counter piracy.

More progress occurred in counterpiracy diplomacy during the ninety days between the end of October 2008 and end of January 2009 than had transpired

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in the previous ninety years. During this time the United Nations finished a comprehensive report on the issue of piracy off the coast of Somalia, and the Security Council adopted Resolutions 1846 (on 2 December) and 1851 (on 16 December). Resolution 1851 encouraged creation of a multinational Contact Group on Piracy off the Coast of Somalia; the "Contact Group," as it is known, consists of more than twenty nations and met for the first time in January 2009. Since then, the Contact Group and subordinate working groups have met on a number of occasions, with the fourth meeting, in September, to be chaired by Japan. The United Kingdom signed a bilateral agreement to hand over pirates to Kenya in December, and the United States signed a similar agreement in

January. (The European Union and Kenya signed a similar accord on 6 May. The Arab and African states in the region reached agreement on the nonbinding Djibouti Code of Conduct to facilitate greater regional cooperation against piracy. Both the Contact Group and the Djibouti Code nations acknowledged the need to create a regional counterpiracy center modeled on the sixteen-nation regional counterpiracy Information Sharing Centre in Singapore.

In early 2009 the expectation was that these efforts would soon begin to pay off, reducing the number of attacks from 2008. Nearly nine hundred seafarers had been taken hostage in 2008, and pirates had seized more than forty vessels. But by May 2009 the number of piracy attacks off the coast of Somalia already had eclipsed the figure in 2008. The blueprints for a more effective international-law framework have largely been drafted; reducing piracy now requires that the next steps be taken.

With this in mind, the International Law Department of the Center for Naval Warfare Studies at the Naval War College in Newport, Rhode Island, conducted a counterpiracy workshop on 7 and 8 April 2009.¹ Comprising fifty legal and policy experts from across the globe, the workshop captured a number of findings and vetted recommendations for continuing the effort against maritime piracy. The participants “took away” four major findings. First, it was apparent to them that piracy in the Horn of Africa has emerged from a complex political, economic, and cultural milieu. No single response will solve the problem. Second, regional capacity building and collective maritime action will be required to contend with the challenge of piracy so long as pirates enjoy sustained sanctuary in Somalia. Proposals to stop piracy by “fixing” Somalia, however, beg the question of how to go about the task, as it is doubtful that the international community has the capability or will to transform Somalia quickly into a stable and viable state.

Third, the participants were convinced that only the major maritime powers have the skill and resources to help the regional states expand coastal and littoral maritime-security capability rapidly. Security assistance to the regional states, including training and provision of patrol craft, can shift responsibility for counterpiracy to the states of the neighborhood. Eventually, these states should acquire and operate offshore patrol vessels, even corvettes. Shifting responsibility for maintaining rule of law at sea to the regional powers, the workshop felt, benefits everyone. Finally, the civil shipping industry should take a greater role in protecting merchant vessels, including integrating passive design measures that make it more difficult for pirates to board a ship. In some cases, this means that provision of private armed security may be appropriate.

The workshop was designed to take a fresh look at the threat of maritime piracy off the Horn of Africa, assess the tremendous progress in international law

and diplomacy that has transpired to address the problem, and consider the way forward. By collecting many of the world's top experts to consider the threat of maritime piracy and by providing a forum in which they could discuss the issue in a frank and open way, the workshop challenged some conventional thinking and explored new approaches. The participants brought significant diversity and depth of expertise. Many are involved in day-to-day decision making on counterpiracy operations, policy, and international law in Europe, Asia, and the United States.² The workshop comprised participants from South and East Asia, Europe, and the United States. The participants represented a variety of eclectic professional backgrounds; they included international-law attorneys; advisers in the areas of oceans policy, irregular maritime warfare, and maritime piracy, from several continents; representatives of the international civil shipping industry; and maritime piracy and naval experts from academic and policy research institutions. The work was facilitated by a state-of-the-art briefing center—the Naval War College's Decision Support Center—that can anonymously tabulate participants' responses to issues under consideration, creating a nonattribution record of the proceedings.

THE THREAT

The workshop opened with a presentation by a prominent irregular maritime warfare expert, who provided a threat assessment for the group. The threat assessment concluded that although Somalia is a failed state, it is not a failed society. Central government has collapsed, but other forms of authority remain. Some forms of authority are local, restricted to individual towns and villages. Others derive from clan or subclan status and from elders able to exercise their authority using traditional means. Power also flows from political figures, who exercise authority through negotiation or the patronage of largely self-interested supporters or allies. Finally, militias and Islamic courts exercise considerable influence in Somali society. Clan organization, then, is a context rather than a determinant of piracy.

On 21 November 2008 the UN released a report by the special representative of the secretary-general on piracy off the coast of Somalia, based on meetings held in Nairobi, Kenya.³ The Nairobi report suggests that piracy off the coast of Somalia is driven by the volatile security and political situations inside the country, rampant poverty, and other factors. Using the Nairobi report as a point of departure, the workshop considered the leading contributors to maritime piracy in East Africa. The workshop participants considered the causal factors contained in the Nairobi report as potential drivers of Somali piracy, independently scoring them by perceived importance.

Among the factors considered as potentially contributing to Somali piracy were poverty; lack of employment; environmental hardship; a reduction in pastoralist and fishing resources; illegal, unregulated, and unreported (IUU) fishing; and the volatile political and security situations. The experts were asked to score these factors in order of importance. On average the participants scored factors highest in relation to the volatile security and political situations in Somalia and lowest in regard to environmental hardship. Several workshop experts suggested additional factors that they considered important in fostering conditions in which piracy can flourish. First, a sanctuary ashore provides a haven from which pirates can operate with apparent impunity. Second, the opportunity to conduct piracy is enhanced by the geographic location of the nation of Somalia and close proximity of the major piracy hubs of Haradhere and Eyl to the international shipping route through the Suez Canal. Third, the presence in Somalia of legions of destitute young men and of numerous unpaid, or underpaid, complicit and corrupt officials populates the piracy enterprise. Finally, the low level of risk of getting either caught or killed while committing piracy, and the prospect of high rewards, continues to draw Somalis into the illicit business. The risk/reward calculus is favorable to piracy, attracting more than two hundred teams, and the number is increasing.⁴ It has to be changed.

A number of nations have readily paid ransoms in order to obtain the release of their nationals and ships held by Somali pirates. Some states, including Denmark, have themselves released captured pirates unpunished due to legal and diplomatic confusion or difficulty in detaining and prosecuting the perpetrators in criminal court. The Nairobi study suggests that these practices have encouraged piracy. Although the wider international community has universally condemned piracy off the coast of Somalia, the Nairobi report indicates, the same nations have been tolerant of piracy by either sanctioning the crime or facilitating payment of ransoms. Some nations have deployed warships to the area apparently without giving them authority to take robust action to arrest or detain pirates or to use force to disrupt attacks. The workshop experts were asked to characterize whether they agreed with the Nairobi report's description of the response by the international community. Most of the experts—thirty of thirty-four—either agreed or strongly agreed with the report's characterization that the international community has either sanctioned or tolerated maritime piracy off the coast of Somalia. Only four experts either disagreed or strongly disagreed with the report in this regard.

The workshop received a detailed brief on the political, social, and economic motivations of Somali pirates. Pirates are exploiting the vacuum created by anarchy in Somalia. The lack of rule of law inside the nation spills offshore. Somali pirates are driven by the goal of pecuniary gain. Moreover, the crime of

maritime piracy has some amount of acceptance in a society whose values have been distorted by conflict and violence. Piracy in the offshore areas of Somalia is perpetrated by organized criminal gangs that benefit from political protection, so solutions will have to account for the wider political context inside the country. The rational risk/reward calculus of the pirate gangs has to be changed by making piracy less rewarding and at the same time more risky. So far there has been a high tolerance for piracy because costs are diffuse throughout the international system, with no single nation bearing the burden. Consequently, organizing a response to thwart piracy represents a classic collective-action problem. The need to shift the outcome of this equation is obvious, but the means to do so are debatable. This conclusion gives rise to the division of responsibility among regional states, distant states, and the private sector.

The experts carefully considered a series of questions posed to them over the course of the two-day workshop. Many of the queries were designed to capture the sense of the group by placing a proposition on the table and then asking the experts to respond. Generally, participants categorized their replies into quintiles—strongly agree, agree, neutral, disagree, or strongly disagree.

The experts provided individual assessments of the likely impact of Somali piracy on international trade from Europe to Asia through the Suez Canal and the Gulf of Aden over the next five years. Twenty of thirty-four experts agreed that the impact of Somali piracy is likely to be severe on Europe-to-Asia maritime trade through the Suez Canal, the strait of Bab el Mandeb, and the Gulf of Aden over the next five years. Thirteen experts disagreed or strongly disagreed, and one expert was neutral on this question. In sum, there was a lack of consensus on the severity of the impact of Somali piracy along the critical trade route connecting Europe and Asia.

The workshop also considered the anticipated impact of Somali piracy on global shipping over the next five years. The participants' views were even more circumspect than on the previous question. A greater number of experts—sixteen—either disagreed or strongly disagreed with the proposition that the likely impact of Somali piracy on global shipping will be "severe." Seven participants registered a "neutral" response, and no expert was in strong agreement with the statement that the impact of piracy will be severe.

Similarly, the workshop experts were not in agreement on the number of piracy attacks expected to occur in the region in 2012. In 2008, more than a hundred vessels were attacked, and more than forty were hijacked off the Horn of Africa. When asked, "By 2012, how many vessels do you expect to be successfully hijacked in the region?" the experts gave estimates ranging from a low of two or three per year to a high of 450, with most responses in the 50-to-250 range.

There was, however, quite strong agreement that if Somali piracy is to be successfully addressed, the rule of law has to be restored in the Puntland region of Somalia. Puntland serves as the primary staging area for most piracy emanating from the country. Thirty-three out of thirty-four experts agreed or strongly agreed that restoration of the rule of law in Somalia was essential for curbing piracy. Only one expert disagreed with the statement that “in order to curb piracy in the offshore region, it is necessary for law and order to be restored in Puntland and the coastal areas of Somalia.”

The next question considered by the experts posed a broader challenge: If it is necessary to restore law and order in Somalia, how can that goal be achieved? There is an absence of international consensus on how to engineer the stabilization and reconstruction of Somalia; some analysts are so discouraged that they doubt the country can be stabilized any time soon. The elusive quest for a “Somalia policy” has persisted since the collapse of the country in 1991; neither the United States nor other nations have found a coherent approach to revitalizing the country. The issue of piracy, however, has now attracted public attention to the plight of Somalia. On 23 April 2009, thirty nations participating in a UN meeting in Brussels developed a \$250 million plan to restore stability in the fractured state. Strengthening regional maritime security in order to reduce piracy was among the top concerns at the conference. The international community, the conference attendees felt, has a chance to turn adversity into opportunity and perhaps bring some measure of law and order to the country. It remains to be seen whether the donors’ conference that was conducted in Brussels will make a positive and marked difference.

REGIONAL RESPONSES

During the past five years, a large group of Asian states have cooperated to counter piracy in the straits of Malacca and Singapore and throughout Southeast Asia. Many observers credit these efforts with reducing the incidence of piracy throughout the Asia-Pacific, and such cooperation has knit the nations together in a regional counterpiracy community. Asian counterpiracy cooperation has emerged from three mutually supporting initiatives.

First, under the leadership of Japan in 2004, sixteen nations signed the Regional Agreement on Combating Piracy and Armed Robbery (ReCAAP).⁵ ReCAAP, the first treaty dedicated solely to combating piracy, established an organization that operates an advanced information fusion and sharing center in Singapore. The Information Sharing Centre helps individual nations take action to avoid piracy attacks and respond more effectively when they occur. Second, beginning in 2005, more than twenty-five states that regularly use the straits of Malacca and Singapore—including the large trading nations of China, Japan,

the United States, and Korea—began meeting with the littoral states of Malaysia, Indonesia, and Singapore to develop a combined framework for improving maritime safety in the straits.⁶ The meetings were sponsored by the International Maritime Organization (IMO), the UN specialized agency for maritime matters and shipping regulation, located in London. After several years, the user nations and littoral states signed the Cooperative Mechanism, an agreement that enables user states to help littoral nations develop maritime-security capacity for better management of the straits.⁷ Third, the three littoral states along the straits of Malacca and Singapore also began coordinating surface and air patrols in order to improve security in the area. Recently Thailand has joined the effort.

The workshop experts considered whether these three East Asian initiatives could be transplanted successfully to East Africa. Although the benefits of doing so were potentially significant, the responses indicated that the experts were quite divided on the feasibility of transplanting the “Asian model” of counterpiracy cooperation and international institutions to the Horn of Africa. Thirteen experts disagreed or strongly disagreed that the Asian initiatives were a suitable model for East Africa. On the other hand, twelve experts either agreed or strongly agreed that such institutions could be transplanted from Southeast Asia to the Horn of Africa. Seven experts were neutral on this issue.

Relatedly, the experts were nearly unanimous in rejecting the notion that no key differences exist between piracy off the coast of Somalia and in Southeast Asia. Seventeen experts strongly disagreed, and thirteen disagreed, with the proposition that no key differences existed between piracy in Africa and piracy in Asia. Only one expert agreed (and one expert strongly agreed) with the statement. Somalia is a failed state, embroiled in crime, ethnic and tribal conflict, and endemic corruption and woefully lacking effective governance, predictability, and rule of law. Its social fabric and governance are in disrepair. Its neighboring nations of East Africa are more functional, but even they face startling defects in governance, security, and bureaucratic capacity. The region is not economically dynamic, like East Asia. Consequently, the area suffers from a low tax base, low penetration of technology, and difficulty in integrating populations of various backgrounds.

Similarly, nearly all of the discussants disagreed or strongly disagreed with the idea that no modifications would be required if the Asian model of fighting piracy could be transplanted to Africa. Clearly, if East Asian approaches and institutions are to be adopted in East Africa, they will have to be tailored to local conditions. Only one expert suggested that no modification would be needed for transplanting the Asian model to the Horn of Africa. Eighteen experts strongly disagreed and thirteen experts disagreed with the statement that no modifications to the

Asian model of counterpiracy cooperation would be necessary in order to transplant it to the coast of Somalia.

DIPLOMATIC RESPONSES

Given that it is unlikely that quick progress can be made in changing the fundamental conditions that abet piracy, the immediate focus must be on containing it and taking cost-effective measures to reduce or manage the risk. The international community already has achieved significant diplomatic success in countering piracy.

Recent efforts include, as previously mentioned, release of a UN study (the Nairobi report); formation of the UN Contact Group; negotiation of the Djibouti Code of Conduct; bilateral agreements between the United States, the United Kingdom, and the European Union, respectively, with Kenya; and Security Council Resolutions 1816, 1838, 1846, and 1851, under Chapter VII of the UN Charter (authorizing states to take “all necessary measures”). With a view toward building on this progress, the experts were asked to consider how much responsibility various global actors had for addressing the problem of piracy off the coast of Somalia. Among the categories of actors were regional states, the shipping industry, flag states, and nations with the most registered vessels at risk of piracy attack. Interestingly, the workshop experts assigned fairly similar levels of responsibility to regional states, the shipping industry, and flag states.

The workshop experts also were asked to score the importance of various international institutions in countering maritime piracy off the Horn of Africa. The experts each assigned values to the relative importance of particular international institutions in addressing the problem of piracy off the coast of Somalia. The UN Security Council topped the list of the most important global institutions for countering maritime piracy, followed by the IMO and the European Union.

Furthermore, the workshop considered the question of whether the diplomatic efforts now under way were well integrated with the naval efforts to suppress piracy. The responses to this question indicated a lack of widespread agreement among the experts on the point. Twelve experts agreed or strongly agreed that the efforts were well integrated, eleven experts were neutral on this point, and ten experts either disagreed or strongly disagreed with the proposition. In addition to responding to these questions, the experts provided recommendations on other diplomatic initiatives that might offer promise. It was noted that the Djibouti Code of Conduct was a nonbinding instrument and some experts suggested that the Arab and African states that negotiated it should make it a binding treaty. Furthermore, participants felt states from outside the area should be encouraged to provide assistance in the form of

training, communications, small boats, and infrastructure to improve the maritime-security capacity of the nations of the Horn of Africa. Just as Japan provided leadership in construction of a regional counterpiracy center in Singapore, one or more nations should assist the regional states in the construction and operation of a regional maritime-security coordination center. In this regard, Egypt and Saudi Arabia possess the means and the interest necessary to develop greater maritime security in the region.

The UN Security Council, the experts suggested, should consider authorizing naval forces operating in the area to seize the accoutrements of piracy, such as high-horsepower outboard motors mounted on the sterns of Somali skiffs. The Security Council could declare a specifically tailored maritime exclusion zone adjacent to the Somalia coastline, forbidding the use of large outboard motors within it. Fishermen and other civil boatmen have little need for high-powered outboard motors, which enable the small and fast pirate skiffs to overtake large merchant vessels. By banning the use of such powerful engines, the international community can reduce the availability of the means of pirate attack. Such engines should be subject to seizure and destruction on sight by the international naval forces operating in the area.

Further, the Contact Group should adopt a means of decoupling the Somali piracy gangs from the tribal and social structure of the country through targeted aid and increased support to alternative centers of authority inside the country. The donors' conference is a first step toward realizing this approach. Furthermore, the international community, possibly working through INTERPOL, should implement a counterpiracy "rewards for justice" program to identify and apprehend the leading offenders.

OPERATIONAL COORDINATION

Somalia has the longest coastline in Africa, off of which are over two million square miles of water at risk of piracy, a factor that complicates naval strategy. The experts were divided as to whether the world's naval forces are effective in addressing piracy off the Horn of Africa. Not one expert strongly agreed that naval forces are effective and sixteen experts either disagreed or strongly disagreed. Four experts were neutral on the proposition, and ten experts agreed, that naval forces were effectively responding to piracy.

Moreover, the deployment of large numbers of warships from distant states into the area is probably not sustainable. Many of the nations that have sent warships are unaccustomed to operating them far from home waters and without logistical support in unfamiliar regions. Furthermore, it is not clear that such a large area can realistically be patrolled at all, even by a large multinational force. It would take more than sixty warships to provide an effective presence over the

length of a single, narrow transit corridor. Until other, more effective approaches are developed and begin to show progress, however, there is no immediate substitute for operational patrols by major maritime powers. In fact, a majority of workshop experts—eighteen out of twenty-two—either agreed or strongly agreed that out-of-area naval forces should be doing even more than at present to counter piracy.

The workshop experts offered additional operational options that might be implemented:

- *Deception*: warships disguised as civil merchant shipping (like the World War II Q-ships).
- *Land strike*: armed assault upon safe havens and logistics activities on the shore. (However, it was argued that land strikes against identified pirate staging areas would be difficult to conduct and likely ignite anti-Western reaction and inflame Muslim sensitivities, making the cure worse than the disease.)
- *Blockade*: monitoring the entrance and egress of shipping into and out of Somalia in order to cut pirates off from their bases on land.
- *Embargo*: preventing the introduction, by land, sea, or air, of weapons, communications devices, and other equipment destined for use by pirate gangs.
- *Tailored exclusion zone*: prohibition (as noted above) of the use of certain items or devices, such as high-horsepower outboard motors, in designated areas, such as Somalia's exclusive economic zone.
- *Unmanned systems*: greater use of unmanned systems for detection and monitoring of piracy activity. (It was felt that such technology might reduce warship requirements and serve as a force multiplier for intelligence, surveillance, and reconnaissance.)

It was argued that smaller warships, such as offshore patrol vessels and corvettes, should be employed for combating piracy over the long term. Fast patrol boats are more efficient platforms than large warships for the task, and regional capabilities can be more easily aligned with small boat security operations. Until such time as regional maritime-security capacity can complement or eventually replace the foreign presence, nations could operate offshore patrol vessels from within the region. If safe port facilities are unavailable, such boats could be sea based, with logistics vessels. The limitations of smaller vessels, which include lower endurance and lack of organic aviation, can be offset by operating them in greater numbers from multiple ports and using land-based maritime patrol aircraft.

Further, the experts felt, there is in the near term a need to identify a single contact point—such as United Kingdom Maritime Trade Operations, in Dubai—for vessels facing immediate threats. Over the long term, creation of a regional maritime-security coordination center to fuse intelligence and share information is essential to shifting responsibility toward regional states. This need presents an opportunity for regional states dependent on the safety of freedom of navigation in the Horn of Africa—specifically Egypt, Saudi Arabia, and the Gulf states—to provide funding and training to that end. In one step in the right direction, at a maritime-security conference in Riyadh during the last week of June, delegates from eleven states of the Persian Gulf and Red Sea reached an agreement on creation of an Arab naval task force to address the threat of piracy to oil and gas tankers that transit the Red Sea and Suez Canal to and from the Mediterranean. Bahrain, Djibouti, Egypt, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Sudan, the United Arab Emirates, and Yemen are expected to provide forces for the task force.

Finally, the workshop found, the development of an organic area coastal force, a Somali coast guard, is a necessary, if long-term, goal. The U.S. Africa Command and Central Command should consider creative approaches for international coalition commitments to training and equipping such a force. One opportunity for security assistance and capacity building is the nascent Somali coast guard. After two decades without a maritime force, the nation is developing a coast guard by training five hundred Somali sailors on the grounds of the old port in Mogadishu.⁸

ADDITIONAL FOCUS AREAS

Programs within Somalia

Regional and maritime action is required to contend with the challenge so long as pirates enjoy sustained sanctuary in Somalia. The last time the international community took military action to change the situation in Somalia, it did not go well. As for the future of governance in that nation, it was unclear to the participants whether a stronger central government, on one hand, or stronger clan system, on the other, would yield greater stability and governance. The dichotomy replicates all of the promise—and difficulty—experienced in Iraq and Afghanistan. Nonetheless, providing greater development assistance to Somali clan elders who may have some influence in reducing piracy was suggested. Relatedly, the potential for disrupting the piracy financing and ransom system through coordinated banking security was argued. (A month after the workshop, INTERPOL announced a plan to track piracy financing.)

Industry and Shipping Security

The international civil shipping industry, participants argued, will have to take additional steps to ensure the safety of merchant shipping in the areas of greatest risk. Merchant ships should continue to broaden their defensive responses, to include such passive measures as barbed wire strung on the lifelines and, potentially, assignment of security personnel (either organic or under contract) on board certain ships, such as slow vessels (dredgers and barges) or those carrying sensitive cargoes. At the third meeting of the Contact Group, in New York City on 29 May, Bahamas, Liberia, the Marshall Islands, and Panama, signed the New York Declaration, committing to bringing their large merchant fleets into compliance with the self-protection measures contained in the International Ship and Port Facility Security Code. Combined, these four states account for half the world's international shipping gross tonnage. A majority of experts—a total of twenty—either agreed or strongly agreed that the counterpiracy approaches taken by the merchant shipping industry were well aligned to the threat.

THE U.S. GOVERNMENT

In considering the American interagency process, the experts had mixed views on whether the disparate departments and agencies were working together effectively to address Somali piracy, with most experts characterizing the level of success as neutral or as successful but not “strongly” so. Finally, the majority of experts believed that the interagency community was working well to combat piracy. The experts, which included the lead representatives for antipiracy operations and diplomacy from within the agencies and departments of the U.S. government responsible for American policy, considered this statement: “Within the U.S. government, the interagency community is working together successfully to counter piracy.” Ten agreed with the statement. Six experts disagreed or strongly disagreed with it, but eight experts were neutral on the issue, so there was little consensus on the point.

In a follow-up question, sixteen of the experts held the view that the U.S. executive branch interagency community was working well together whatever the success such work produced. Five experts were neutral on this point, and three disagreed.

However, the experts rejected the idea that no impediments have to be overcome to facilitate interagency cooperation. When asked to evaluate the statement “There are no impediments to U.S. government efforts to achieve interagency cooperation,” nineteen experts either disagreed or strongly disagreed. Four experts were neutral on this proposition, one agreed, and one strongly agreed. The sense, then, is that effective interagency coordination against maritime piracy within the government faces an uphill struggle. This is

somewhat surprising, and discouraging, because American maritime-security policy is coordinated through the Maritime Security Interagency Policy Committee (MSIPC), under policy set forth in National Security Presidential Decision Directive 41 of December 2004. The departments of Defense, State, Homeland Security, and Transportation, as well as the intelligence community and other agencies, participate in regular meetings of that committee. The committee led development of the 2005 *National Strategy for Maritime Security*, annex B to that document, the 2007 *Maritime Security (Piracy) Policy*, and the December 2008 *Action Plan* to counter piracy off the coast of Somalia.

The depth of the discussion and the variety and originality of the discourse, conducted in a nonattribution environment, were productive. The seizure of the *Maersk Alabama*, in particular, has elicited from numerous commentators such prescriptions as “it’s time to get tough,” or “we have to change the risk/reward calculus” of the pirates. Ultimately, everyone agrees that the best solution is for a restoration of law and order within the country of Somalia, but neither the international community nor the United States has been able to produce such an outcome. Hard realities lie behind those platitudes, and they require that specific courses of action be patiently thought through, on the basis of an accurate picture of the causes and motivators of Somali piracy. Furthermore, the workshop demonstrated, there is no single solution to the problem of Somali piracy.

At least the rampant piracy off the coast of Somalia from the seizure of the *Sirius Star* to the attack on the *Maersk Alabama* in April 2009 has focused world attention on an often ignored corner of the globe. In May 2009 the Netherlands and Russia suggested creation of an international piracy court. But perhaps a more promising alternative would be to build the rule of law and capacity for governance and maintenance of security in the states throughout the region. Roughly five hundred men have recently joined the emergent Somali coast guard, but without fast patrol boats, radar, or communications equipment, the force is overmatched by the pirates.⁹ All, Somalia in particular, would benefit from increased security assistance. Just as important, capacity building would generate long-lasting benefits in economic and security partnerships and facilitate closer security integration with neighboring states, friends, and allies.

Operationally, the threat of piracy has presented the first test of the concept of a spontaneous “global maritime partnership” and of the U.S. sea services’ *Cooperative Strategy for 21st Century Seapower*.¹⁰ By any measure, the concepts are being validated, and the test is being passed. The follow-through, the movement from coordination among the larger out-of-area naval forces toward regional efforts and local capacity building, will require commitment, generous resources, and political resolution in East Africa and throughout the globe.

NOTES

An earlier version of this text has been circulated in pamphlet form as Commander James Kraska, JAGC, USN, *The Report on the U.S. Naval War College Workshop on Somali Piracy: Fresh Thinking for an Old Threat* (Newport, R.I.: Naval War College, 28 April 2009).

1. The workshop was sponsored with generous support from the Naval War College Foundation, SAIC Corporation, and Booz Allen Hamilton. Professor Dennis Mandsager, chairman of the International Law Department, provided strategic guidance for the project, and Commander Sandra Selman, USCG, was a principal organizer of the event.
2. This point was underscored on the second day of the workshop, when a number of attendees joined a U.S. government interagency phone conference to plan a course of action for dealing with the overnight hijacking and ensuing hostage standoff involving the M/V *Maersk Alabama*.
3. Ambassador Ahmedou Ould-Abdallah, comp., *Piracy Off the Somali Coast: Final Report: Assessment and Recommendations* (report of Workshop Commissioned by the Special Representative of the Secretary-General of the UN to Somalia, Nairobi, Kenya, 10–21 November 2008).
4. Richard Meade, "Pirate Threatens Increased Violence," *Lloyd's List*, 8 July 2009, pp. 1–2.
5. The sixteen countries were the People's Republic of Bangladesh, Brunei Darussalam, the Kingdom of Cambodia, the People's Republic of China, the Republic of India, the Republic of Indonesia, Japan, the Republic of Korea, the Lao People's Democratic Republic, Malaysia, the Union of Myanmar, the Republic of the Philippines, the Republic of Singapore, the Democratic Socialist Republic of Sri Lanka, the Kingdom of Thailand, and the Socialist Republic of Viet Nam.
6. *Kuala Lumpur Statement on Enhancement on Safety, Security and Environmental Protection in the Straits of Malacca and Singapore*, IMO Doc. KUL 1/4, 20 September 2006 (report of Kuala Lumpur Meeting on the Straits of Malacca and Singapore: Enhancing Safety, Security, and Environmental Protection, 18–20 September 2006), available at www.imo.org/.
7. The Singapore meeting also recognized the contributions of the straits states in the development of Malacca Strait security initiatives.
8. Alisha Ryu, "Analysts Skeptical New Somali Navy Can Fight Piracy," *Voice of America News*, 18 June 2009, available at www.voanews.com/english/.
9. Jamal Osman and Lauren Gelfand, "Somalia Trains Navy Recruits in Anti-piracy Struggle," *Jane's Defence Weekly*, 24 June 2009, p. 25.
10. See James Kraska and Brian Wilson, "The Co-operative Strategy and the Pirates of the Gulf of Aden," *RUSI Journal* 74, no. 81 (April 2009), and James Kraska and Brian Wilson, "The Global Maritime Partnership and Somali Piracy," *Defense & Security Analysis* 25, no. 3 (September 2009). The strategy was reprinted in the *Naval War College Review* Winter 2008 issue, available at www.usnwc.edu/press/.

REVIEW ESSAYS

MORE THAN THREE LAWS OF ROBOTICS

John Edward Jackson

Singer, P. W. *Wired for War: The Robotics Revolution and Conflict in the 21st Century*. New York: Penguin, 2009. 499 pp. \$29.95

“May you live in interesting times” is frequently used as shorthand for enduring periods of tumultuous change. Few would dispute that global events during the opening decade of the twenty-first century have indeed been “interesting.” In his carefully researched and cleverly written book *Wired for War: The Robotics Revolution and Conflict in the 21st Century*, Brookings Institute senior fellow P. W. Singer postulates that technological advances in artificial intelligence and robotics engineering (which together create the robotics revolution) are destined to guarantee that conflict in the twenty-first century will indeed be “interesting”! He effectively argues that the voracious appetite of tech-savvy

consumers and the outrage of casualty-averse citizens (and, to a degree, military leaders) will combine to generate an explosion of highly capable robotic systems in the home, office, and battlefield. Society’s tolerance for casualties in war has evolved from the public’s general acceptance of over five hundred thousand casualties in just five days at the first battle of the Marne at the beginning of the twentieth century to the attitude widely held in the Western world that in the twenty-first century few, if any, young warriors should be required to perish in defense of the republic. The potential for machines to fight to

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their last circuit board while their human masters remain safe is an intoxicating, if unrealistic, scenario for future war.

Many observers believe that the combination of supercomputing technology and cutting-edge robotic engineering will drive changes within the military environment equal to the impact of the widespread use of gunpowder in the sixteenth and seventeenth centuries and of steam propulsion for ships in the nineteenth century. These changes relate not only to the development and manufacture of highly capable future systems but also to issues regarding their ethical use and the manner in which command and control will be exercised.

Chapter by chapter, *Wired* displays the history, current status, and possible future of the relationship between man and machine. In a chapter entitled “Smart Bombs, Norma Jeane, and Defecating Ducks: A Short History of Robotics,” Singer blends playful prose with extensively annotated research to highlight three hundred years of robotic development. In answering the self-imposed question “Why a book on robots and war?” Singer simply states that “robots are frakin’ cool.”

For those who may not recognize this version of the ubiquitous “F-word,” it is a censor-friendly expletive that peppered the dialogue of the wildly popular remake of the science-fiction classic *Battlestar Galactica*. Singer’s unbridled declaration is the first, but by no means the last, reference to science fiction in *Wired*. In fact, when you search for the term “science fiction” in an electronic copy of *Wired for War* on a Kindle e-book reader (which sure seems like a piece of gear Spock would have used in the original *Star Trek* series), you get 196 hits. Singer notes that “science fiction [sci-fi] is more than just popular; it is also incredibly influential, to an extent that is often surprising.” He goes on to say that “part of the popularity of science fiction comes from its remarkable skill at foreshadowing the future.” He makes his point that would-be futurists should be avid consumers of science fiction by citing the predictions of such writers as H. G. Wells, Jules Verne, and Robert Heinlein, whose visions of the future have in many ways come to pass. Sci-fi fans can be found in the strangest places, and Singer notes that the Joint Chiefs chairman, Admiral Mike Mullen, “proudly describes how the Navy’s Professional Reading Program, which he helped develop to guide his sailors, includes the science fiction novels *Starship Troopers* [1959] and *Ender’s Game* [1985].” As a point of interest, *Wired for War* is now also a recommended supplemental selection in the Navy’s Reading Program.

To be clear, this book is far more than a paean to science fiction, for Singer does a remarkable job of cataloging the ways in which the military forces of the world have adopted robotic technologies. He speaks of the thirteen thousand ground-based robots, six thousand aerial systems, and hundreds of sea-based systems in the active inventory of soldiers, sailors, and airmen around the world.

Singer also describes such sophisticated systems as the RQ-4 Global Hawk, a thirty-two-thousand-pound unmanned reconnaissance airplane with a 130-foot wingspan and a 5,400-mile operating radius. Putting the Global Hawk's operating envelope into more familiar terms, Singer states, "Global Hawk can (in effect) fly from San Francisco, spend a day hunting terrorists in the entire state of Maine, and then fly back to the West Coast." In reality, the RQ-4s fly from bases in the Middle East while being monitored and controlled by pilots sitting at command consoles at Beale Air Force Base, in California. The U.S. Navy is now operating a maritime version of Global Hawk, as part of the Broad Area Maritime Surveillance (BAMS) program. Though the aircraft are launched, recovered, and maintained in the Middle East, all are controlled from Naval Air Station Patuxent River, Maryland. In addition to these reconnaissance tasks, the nightly news is filled with coverage of armed Predator and Reaper unmanned aircraft systems regularly attacking targets in Iraq, Afghanistan, and other locations, in the service of both the U.S. Air Force and the Central Intelligence Agency. Singer goes from these large-scale aircraft to the micro, unmanned air vehicles (some weighing less than a pound) at the opposite end of the size spectrum, to other tactical systems that are literally tossed into the air by soldiers in the field.

On the ground, robots have become indispensable partners to the men and women who risk their lives on a daily basis to locate, disarm, or destroy the primary weapon of the Iraqi insurgency—the improvised explosive device (IED). Singer opens chapter 1 with a touching story about the loss of an explosive-ordnance-disposal technician in Iraq, but he provides a happy ending when he discloses that it was a robot that took the blast—no letter had to be written home to grieving parents. He provides vignettes of troops working side by side with PackBots, SWORDS, throw-bots, TALONS, and even an experimental system called the Robo-Lobster. His forty-five pages of notes provide countless resources for readers who seek to learn more about these systems.

The real strength of this work, however, is that it goes well beyond the science and technology of unmanned robotic systems, delving into the legal and ethical ramifications of their use. Singer weighs the arguments for and against greater autonomy for robotic systems and considers the pros and cons of "keeping a man in the loop" to provide a degree of human judgment in potentially lethal operational decisions. The problem, however, is that decision loops of less than a second make this impossible. He quotes a U.S. Army colonel who says that "the trend towards the future will be robots reacting to robot attack, especially when operating at technologic speed. . . . As the loop gets shorter and shorter, there won't be any time in it for humans." One wonders, however, who is responsible if a robot accidentally kills the wrong person. The programmer? The operator? The

vendor who sold the product? Singer does not try to answer these questions but rather encourages the reader to think about them in the context of future wars.

Singer does not limit his learned discussions to war-bots but touches also on robots in the home (more than three million Roomba robotic vacuums have been sold), in research (NASA flies several Global Hawks), and in everyday life (ATMs, security robots, and automated systems in our cars). These topics inevitably lead to a discussion of artificial intelligence and the question of how smart should we allow these machines to become, at what point they might become a threat to their creators. A half-century ago, the noted author Isaac Asimov postulated his famous “Three Laws of Robotics,” which sought to ensure the safety and superiority of the human race. In reality, securing our future may require far more than three simple laws.

This book is a must-read for futurists, fans of technology, and students of war. It is, in fact, the required text for a new course at the Naval War College entitled “Case Studies in Technology and Warfare: Unmanned Systems,” which was first offered in the 2009–2010 semester.

Singer closes with some sobering food for thought: “And now we are creating something exciting and new, a technology that might just transform humans’ role in their world, perhaps even create a new species. But this revolution is mainly driven by our inability to move beyond the conflicts that have shaped human history from the very start. Sadly, our machines may not be the only thing wired for war.”

IVORY TOWER MEETS JAMES BOND

David C. Foley

George, Roger, and James Bruce, eds. *Analyzing Intelligence: Origins, Obstacles, and Innovations*. Washington, D.C.: Georgetown Univ. Press, 2008. 230pp. \$29.95

As I look at the intelligence community, it should not “support” or “oppose” an administration. It should be professional, factual and give the best possible analysis, regardless of where the chips may fall.

SENATOR DIANNE FEINSTEIN

Senator Feinstein’s comment, found on a November 2004 memo written by then–CIA director Porter Goss regarding potential politicization of intelligence analysis, could serve as the preamble to this book. The editors, Roger George and James Bruce, themselves respected career intelligence analysts, have assembled a compendium of essays by leading lights of the U.S. intelligence community, essays that examine the history, efficacy, pitfalls, and achievements of U.S. intelligence analysis roughly from World War II to the present. They also make a number of recommendations for improving analysis, thereby reducing the likelihood of “intelligence failures” that have so frequently been in the media spotlight over the past several years.

Curiously enough, in their introduction George and Bruce cast this book as one of a precious few that examine intelligence as a profession, and indeed they pose the direct question: “Is there a professional discipline known as intelligence analysis?” As a career intelligence officer myself, my initial reaction to this question was that it is unworthy of serious discussion, as intelligence craft in the

United States has been institutionalized (most notably) within the CIA since 1944, or as far back as the creation of a distinct Office of Naval Intelligence in 1882. Yet upon further reflection, I can attest that this is a fair question, and this book takes a crack at answering it.

Over the course of my career, I have frequently encountered the debate of science versus art regarding the field of intelligence. Few doubt the science behind the technologies committed to intelligence collection

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and to exploitation of the data. From satellites to cross-referenced computer databases to unmanned vehicles, the U.S. intelligence community has been at the cutting edge of technology and has pushed the limits of the ability of science to collect and turn myriads of data points into value-added knowledge for decision makers. Yet it is on the analytic side, which is what George and Bruce largely address, that art enters. Even the most accurate raw data must ultimately be synthesized and interpreted by human minds, and thus varying conclusions, let alone predictions, are inevitably drawn. Even with today's advanced computing power, life factors of the analyst and the analyzed are many and unpredictable, and they do not lend themselves well to straight-line logic or laboratory replication. So a consideration of the degree of professionalization of intelligence analysis is welcome.

While the editors declare that the major thrust of this work centers on intelligence analysis as a professional discipline, only a single chapter actually addresses it. The book examines the fields of law, medicine, and library science as exemplars of a defined "profession." In short order, chapter 3 concludes that "to the extent that intelligence analysis has remained idiosyncratic and lacks oversight mechanisms by which all its practitioners systematically acquire, share, and produce knowledge, it is not yet recognizable as a full-fledged discipline."

This, of course, is debatable. There are many factors that argue otherwise, not the least of which is the large number of individuals who have dedicated the better parts of their lives to producing intelligence. Others include a common lexicon that exists across the intelligence community and a similarity of approach toward assessment making among most intelligence organizations. Yet this provocative conclusion gets the reader's attention, and it serves George and Bruce well as a point of departure for the rest of the volume. Organized into six sections of three chapters each plus a conclusion, *Analyzing Intelligence* ends up being much more than an excursion into the issue of intelligence analysis as a professional discipline. In fact, it covers a broad array of intelligence issues, including a short history of U.S. intelligence, the matter of professionalization of the discipline, and a number of lessons learned, methodologies, and management approaches that can serve to improve the quality of intelligence analysis. Taken as a whole, George and Bruce have succeeded in providing a book that is more primer than an effort to answer the question of professionalization of the discipline. (Indeed, it has recently come to my attention that the volume is required reading for new analysts at the Office of Naval Intelligence.)

The first two chapters briefly outline the history of U.S. intelligence for the uninitiated, and those from chapter 4 on effectively review the bidding of some of the key pitfalls of intelligence analysis, as well as a number of recommendations toward improving the objectivity, quality, and predictive nature of the analysis

produced by the intelligence community as a whole. From the perspective of a career intelligence officer, I found most intriguing the chapters “Policy-Analyst Relationship” and “Enduring Challenges.” These pieces are written from the benefit of hindsight by some of the most senior and experienced intelligence officers and analysts in the community. To name a couple, there are John McLaughlin, former deputy director for intelligence at CIA, and James Steinberg, former deputy national security adviser to the Clinton administration. They lay out several keen insights, such as the inherent dichotomies between the analytic and policy-making communities. For example, McLaughlin makes the point that the policy world is by necessity a culture of optimism, where obstacles, including contrary intelligence assessments, are meant to be overcome. Intelligence analysts, on the other hand, are focused on threats and dangers, leading to a darker culture, more marked by skepticism. Steinberg points out that this natural friction between policy makers and intelligence analysts is exacerbated by unrealistic expectations and lack of appreciation. Policy makers and other intelligence consumers crave clarity and certainty, whether in execution of political initiatives or military operations, and often do not understand the limitations of intelligence. Analysts, for their part, often do not appreciate the many factors, of which intelligence is but one, that weigh upon policy makers.

McLaughlin and Steinberg offer several strategies to overcome these frictions, such as embedding intelligence analysts into policy-making circles, informing leaders of intelligence limitations, and producing and presenting intelligence assessments as tools that help policy makers think through the problems, rather than as data dumps. McLaughlin makes a particularly salient point where he asserts that surprise (the thing most irksome to leaders) “is almost never the result of an easy-to-predict shift. It almost always creeps up on you.” Clearly, one of the greatest services analysts can perform is keeping leaders a step or two ahead of major changes.

Several contributing authors use the failure of the intelligence community to warn of the events of 9/11 and the inaccurate assessments of Iraq’s weapons of mass destruction (WMD) prior to the 2003 U.S.-led invasion as central lessons for improved analysis in the future. One chapter focuses on the imperative for the analyst to avoid politicization yet remain relevant to the issue at hand. Another chapter reviews the analytical dangers of foreign denial and deception, which was clearly evident and effective in the case of the nonexistent Iraqi WMD programs and stocks. A point is made that though denial and deception is more about the limitations of intelligence collection than analysis, the savvy analyst must remain cognizant of these limitations throughout the analytical process—easier said than done. Surprisingly (in that I am a career

intelligence professional), by the end of the book I was better informed regarding what went wrong with intelligence support surrounding 9/11 and the Iraq War, a benefit of taking the time to read this book.

I would be remiss not to comment on chapter 9, which concerns challenges to U.S. military analysis. David Thomas, a senior analyst at the Defense Intelligence Agency, points to several “perennial” problems, such as the ponderous, bureaucratic behavior of military organizations, which in his view impedes creativity and dissemination. He also points to “new” problems, such as the increased speed of modern military operations, the diminished analytical capabilities of defense intelligence agencies due to numerous reorganizations, excessive focus on current intelligence, and (perhaps as a result) the attrition of experienced analysts, both in uniform and out. I can attest to some of these points, especially the one about the detrimental impact of reorganizations. I experienced this during tours with the Joint Staff, Navy Staff, and the Office of Naval Intelligence. Some of these initiatives had positive outcomes, but they were clearly taxing to the organizations, especially to the long-term civilian workforce.

Wrapping up their book, George and Bruce are cautiously optimistic that the intelligence lessons of the past several years, combined with a better appreciation of collection limitations and some new approaches to analysis (e.g., computer-aided analysis of competing hypotheses and others), will lead to more objective and reliable intelligence assessments. Yet they also admit that “fixing analysis seems a perennial and elusive goal,” even given the several reasonable fixes proposed in this book. One of these recommendations involves greater educational opportunities for analysts, to include job rotation for analysts into American academia, and likewise for academics to take up temporary residence within intelligence community organizations. This should resonate with, at a minimum, the military service colleges and the National Defense University, convenient places for the integration of academia and intelligence analysis. Call it Ivory Tower meets James Bond. Call it what you will, but it is an idea whose time has come, and *Analyzing Intelligence*, although not fully convincing about the lack of a “professional” discipline of intelligence analysis, is worth the read for those concerned with effectively “connecting the dots” ahead of the next crisis on the horizon.

BOOK REVIEWS

WHAT MAKES A LEADER?

Sheehan, J. Kevin. *A Leader Becomes a Leader: Inspirational Stories of Leadership for a New Generation*. Belmont, Mass.: TrueGifts, 2008. 230pp. \$27.95

At first glance, this book seems to be something much like a book of virtues. It is a series of brief biographical sketches that might be mistaken as a return to a simpler and more forgiving literary genre—one where leaders are joyfully portrayed in the most positive light and any trait or act that could be considered detrimental is ignored. Sheehan seems truly to admire his subjects, and his lyrical facility with verbal imagery is so rich that the narrative at times approaches poetry. The book is copiously illustrated and loaded with biographical observations and quotes. Taken in its entirety, it is hard to imagine how *A Leader* could get farther from the in-depth, “warts and all” treatment that modern biographers have come to embrace.

Yet this is not, appearances perhaps to the contrary, a simple book. It provides real value to a spectrum of disparate audiences on very different levels. Readers who do put down the volume after a quick glance-over should not be surprised to find themselves returning later to its pages. This is a work that tends to

raise questions after the book is back on the shelf.

Its list of “leaders” is long and covers a broad range of professions and pursuits. Some readers will have trouble accepting all the showcased people as true “leaders.” There are scientists, presidents, philanthropists, artists, athletes, political activists, and religious figures. There are relatively few business tycoons and soldiers. While war leaders are not completely absent, as attested by the inclusion of Churchill and Lincoln, the book boasts only one military leader, General George Marshall. (Marshall’s virtue is “command presence.”) Whether or not each of the individuals identified in the book is a leader may be debated, but there is no doubt that they are all exceptional.

This book raises several intriguing questions, some of which it attempts to answer; others silently accompany the material. What makes a “leader,” and just who is a leader? Is the ability to inspire the same as the ability to lead? Does emulation equate to followership? Should possession of additional, less positive attributes detract from a

person's positive reputation as a leader? Is it possible to pick out a single strongest virtue in a leader? How can opposing leadership characteristics both be virtues? Were Grandma Moses, Bob Marley, and Nadia Comaneci truly leaders, or did they simply inspire? Was Churchill's "instinct" truly his most dominant leadership virtue? As for feet of clay, some of the leaders identified in this book may have inspired millions but also cheated on their wives. Anwar Sadat *was* a peacemaker, but he became one only after he had ordered his army to wage an offensive war against Israel. Sheehan identifies the opposite traits of "flexibility" and "determination" as leadership virtues, begging the question of *when* each is a virtue.

The fact that this volume may lead the reader to ask these questions is in itself a virtue. A discussion about whether there are better choices than some of the men and women in the book is bound to be interesting and could well become passionate—another good thing. If Marie Curie is included, why isn't Stephen Hawking? If George Marshall could make the cut, why didn't John Archer Lejeune?

At another, younger level of readership, *A Leader* serves as a marvelous gateway book. Many that have been named will be unknown to the current rising generation of readers. We can only hope that Sheehan will inspire these young scholars to learn more about these remarkable people, making this a book it would be good to see on the shelves of junior and senior high schools across the United States.

RICHARD NORTON
Naval War College



Murphy, Martin N. *Small Boats, Weak States, Dirty Money: Piracy and Maritime Terrorism in the Modern World*. New York: Columbia Univ. Press, 2009. 411pp. \$60

In the past year the public's fascination with piracy has grown as piracy has manifested itself as a more tangible threat to commerce and individuals with the incidents off the Horn of Africa. Whether it was the 2009 pirate attack on the containership MV *Maersk Alabama* or the terrorist attack on the USS *Cole* in 2000, the media found itself at a loss to understand the issue in depth and often turned to similarly misinformed commentators to feed the twenty-four-hour news cycle. Fortunately, the timely *Small Boats, Weak States, Dirty Money* puts to rest misconceptions about modern piracy, surveying as it does the real threats posed by terrorists at sea.

The author asks three questions: What form does piracy take in the contemporary world? What is maritime terrorism? Are the two similar or linked? Although seemingly simple, these questions constitute a necessary launching point for any serious discussion.

Readers will be hard pressed to find a more methodical and better researched book on piracy and maritime terrorism. The bibliography comprises an additional hundred pages, and one chapter alone has five hundred footnotes. Martin Murphy is a senior fellow at the Center of Strategic and Budgetary Assessments, and his extensive academic, professional, and writing credits on littoral warfare and maritime terrorist threats more than sufficiently rank him

among the experts in this small but growing field.

Murphy takes a bifurcated approach that proves beneficial to both the author and the reader. Each half of the book could easily stand on its own, but the pairing is important to distinguish similarities or differences and provides the means for Murphy to discuss the reasons behind these activities and the challenges they engender.

The section on piracy adequately addresses worldwide incidents and provides appropriate regional perspectives. Readers will also benefit from Murphy's evenhanded treatment of the various forms of maritime terrorism, as well as their potential for unintended consequences. His treatment of the 2002 attack on the French supertanker *Limburg* discusses not only the method of attack used by terrorists but the subsequent impact upon the Yemeni port involved, which lost some three thousand jobs due to reduced commerce from an international industry hesitant to place ships at risk. Murphy's discussions of other possible threats, such as divers, swimmers, submersibles, and small boats, as well as of the particular case of ships carrying hazardous cargo (such as liquefied petroleum gas and liquefied natural gas) are particularly helpful in explaining, realistically and dispassionately, the difficulties.

However, this book still offers opportunities for continued debate. Murphy notes, for example, that piracy in the Strait of Malacca was reduced from 2004 to 2005 due to increased cooperation between international navies. Elsewhere, he suggests that the Free Aceh Movement was impacted by the tsunami of December 2004. Would not the tsunami have had a similar effect on

pirates as terrorists, given the devastation it wreaked?

This book sets the standard for future serious works on piracy and maritime terrorism. Murphy's work is a must for both journalists and the military, to gain a proper understanding of these issues.

CLAUDE BERUBE
U.S. Naval Academy



Vlahos, Michael. *Fighting Identity: Sacred War and World Change*. Westport, Conn.: Praeger, 2009. 245pp. \$49.95

Michael Vlahos is a senior member of the National Security Analysis Department at the Johns Hopkins University Applied Physics Laboratory. He was recently a visiting faculty member in the Strategy and Policy Department at the Naval War College. He has written extensively on culture and war, including various projects on Iraq and counterinsurgency.

In *Fighting Identity* (the latest title in the "Changing Face of War" series from Praeger Security International, series editor James Carafano), Vlahos offers an excellent analysis of how war shapes the collective identity at the societal level. Combining a variety of disciplines, including anthropology, history, political science, and philosophy, he builds his argument on a foundation of postmodernist theory, expertly merging social identity, theory, and military history. Treading where social theorists disdain to be and military historians avoid, Vlahos provides essential scholarship.

The construct of the book is cogent. Vlahos outlines his rationale for the project before he delves into theory and definitions. He turns to methodology and research, offering guidelines for future scholarship. His content chapters, “Them,” “Us,” and “Fit,” represent the substance of the book, encompassing his analysis on the development of identity through war. Vlahos’s argument centers on the idea that the interactive nature of warfare creates, and changes, identity.

In his view, war is a “sacred ritual” that has been practiced throughout history and that in turn shapes social identity. These rituals have semireligious undertones and come to represent “humanity’s dark liturgy.” Further, war and interactive conflict shape the identities of participants, cultivating cohesion, motivation, and awareness. Vlahos argues that interaction creates common narratives and also leads to an acquisition of legitimacy. Finally, interactive conflict emerges as a central component of social identity (both national and nonstate), which shapes historical hindsight as well as future policy decisions.

This book draws on Vlahos’s extensive knowledge of history. He flows from the ancient to the contemporary with ease, drawing on past and present examples to support his arguments. In the final chapter, “Where I Come Out,” he argues that the United States is facing a crisis of identity in its own sacred narrative, as it transitions from the Cold War to something new. Finally, he suggests that the social identity of the nation will evolve as it faces the challenges of the twenty-first century.

Overall, this is an exceptional work of scholarship on the creation of social identity, as well as a critique of

American social construct. Vlahos provides an analysis of inestimable value based on an impressive grasp of history and philosophy. Written primarily for scholars, *Fighting Identity* is a modern philosophical treatise on war’s influence on the development and evolution of sacred identity. While I recommend this book for a wide audience, the subtleties of its analysis and the structure of its argument are complex and elaborate. This book is easily read but not easily understood.

S. MIKE PAVELEC
Naval War College



Goodman, Michael S. *Spying on the Nuclear Bear: Anglo-American Intelligence and the Soviet Bomb*. Calif.: Stanford Univ. Press, 2007. 295pp. \$50

The Cold War was a real war, marked by complexity. The nation-states making up the international system (the United States, the United Kingdom, and the Soviet Union) that emerged in the wake of the atomic age were compelled to avoid a general conflict and to protect civilization from nuclear extinction. As such, a variety of instruments were utilized by these great powers. One of those instruments was the collection and analysis of intelligence and, in particular, nuclear intelligence.

The fact is, Goodman, a lecturer in the Department of War Studies at King’s College London, states, that “intelligence was in some ways the cold war waged by other means.” A little known aspect of the Cold War involved the Anglo-American intelligence communities’ intense focus on the development of Soviet nuclear weapons. Goodman’s main contention is that despite the

strictures of the American Atomic Energy Act of 1946 (the McMahon Act), which forbade the transfer of American scientific and technological knowledge of the atomic weapon to any other power, Anglo-American nuclear intelligence cooperation nevertheless went ahead. These two governments used this intelligence to predict outcomes, and what proved to be even more successful, the detection of Soviet nuclear weapons testing.

Goodman's narrative of this effort focuses on long-distance monitoring, as well as acoustic, seismographic, and electromagnetic monitoring of the Soviets' nuclear weapons program. This is, in itself, an excellent insight into the Cold War nuclear intelligence from 1945 to 1958, an invaluable mirror into these efforts.

What sets this work apart, however, is Goodman's placement of what is essentially one mirror behind another—his revelation of the strategic implications of nuclear intelligence-sharing on the Anglo-American special relationship itself, along with the impact of that relationship on the Soviet Union. To understand the dynamics involved, Lewis Carroll's *Through the Looking Glass* is worth recalling, as Alice declares that it is like a huge game of chess that is being played all over the world.

But what of the Soviet Union, the conventionally understood object of all the covert intelligence monitoring and detection efforts? Goodman answers this question in his conclusion. He argues that while extensive literature exists on the Soviet threat and the American perception of it, these works often deal with what he calls an alleged "bomber gap" and "missile gap." He states that "both gaps were figments in the

imagination of the U.S. intelligence community, based in the main on overstating the Soviet potential in order to procure greater funds for military development." While this is a standard critique, Goodman applies what he terms "counterfactual history," a third look into the mirror behind the mirror. Counterfactual history, he argues, "is a tool that often can be used to great effect. The Soviet Union, it seems, would never have seriously contemplated war with the West. Given the American atomic arsenal, it is also unlikely that even if Britain had not developed a nuclear deterrent, the Soviet Union would ever have dared risk war." Goodman then measures the capabilities-to-intentions calculus so familiar to students of the Naval War College, as follows: "In the minds of those who mattered, Soviet capabilities were intimately linked to Soviet intentions. Therefore, while the Soviets were without the capability to wage war, their intentions were perceived to be far less aggressive."

Goodman has produced a definitive work, in that it validates the United Kingdom's unequivocal commitment to an independent nuclear deterrent, and by doing so he has given us a seminal work, a landmark effort in its devotion to prodigious research and commitment to truthful inquiry.

MYRON GREENBERG
Defense Contract Management Agency
Aeronautical Systems Division Ohio River Valley



Brannon, Robert. *Russian Civil-Military Relations: Military Strategy and Operational Art*. Farnham, Surrey, U.K.: Ashgate, 2009. 352pp. \$114.95

Kremlinologists were noteworthy for describing decision making in the USSR as comparable to cats fighting under a large rug in a dark room—the only thing the outside world could clearly and correctly see was the emerging winner of the struggle. Robert Brannon's *Russian Civil-Military Relations* suggests that while Russia's transition from autocracy to nascent democracy has offered observers more transparency, some of the byzantine intrigues remain.

While Brannon summarizes his hypothesis on the evolution of Russian civil-military relations using political-science theoretical literature, this book is all about the three case studies that Brannon brings to life, using his professional notes, along with interviews of the principals and of experts on the subject. The author was in position to know many of the study's protagonists, serving as the U.S. naval attaché to Russia from 1998 to 2001. His proximity to his subjects, however, does not blur his vision. If anything, his harshest appraisals are directed at his closest Russian counterparts.

Brannon illustrates his understanding of Russian civil-military relations by examining the Russian race to Pristina during the Kosovo conflict (1999), the second Russian intervention in Chechnya (1999), and the tragic sinking of the submarine *Kursk* (2000). His writing style enables the casual reader to follow the exciting plots of the episodes with relative ease, each building on the previous story. Some of the juiciest material is in the footnotes, in which Brannon recounts personal tales of harrowing experiences in exotic Russian locales.

This is a book about a subject never widely discussed in the Western press.

During the Bolshevik and communist eras, the Soviet military was slavishly controlled and obedient to domineering and “intrusive” civil authorities, rendering most civil-military discussions irrelevant. However, the relationship of Russian political and military leaders after the fall of the Soviet Union is at best problematic and at worst threatening. Samuel Huntington (the famous American political scientist) held that for a military establishment to act as a profession, it must possess expertise, responsibility, and corporateness.

Brannon argues that the Russian military leadership, while often both incompetent and deceptive, has consistently held to the belief that Russia should be suspicious of American and NATO intentions, whereas the Russian military itself remains strong and assertive, possessing the power to influence international affairs. In other words, with all its flaws, it is a distinct professional organization. However, the author makes a persuasive critique of Russia's political leadership in the 1990s. The military adventurism documented in the three case studies may have been caused largely by the Boris Yeltsin administration's fecklessness while facing budding national security struggles. Military men may simply have been acting as Russian patriots in the face of a political vacuum.

However, the book comes up short in two areas. First, because Russia is unique, it is questionable whether its experience sheds much light on the development of civil-military relations in other postcommunist societies. Second, one of the book's central messages is that the Russian military is in need of reform. Yet as the United States has witnessed over the last decade, terms

like “reform” and “transformation” mean different things to different parties. Brannon never makes clear what he means by his Holy Grail of “reform.”

Brannon sees in Vladimir Putin (and the Dimitri Medvedev–Putin team) the political leadership missing in the 1990s. He suggests that the military is more likely to give its aggressive support and obedience to decisive nationalists who support military reform. This may be both the good and the bad news of this provocative study.

TOM FEDYSZYN
Naval War College



Evans, Richard J. *The Third Reich at War*. New York: Penguin, 2009. 926pp. \$40

This final volume of Richard Evans’s trilogy on the Third Reich (the earlier titles being *The Coming of the Third Reich*, 2003, and *The Third Reich in Power, 1933–1939*, 2005) is a disquieting masterpiece of scholarship. Although many of the events recounted here will be familiar to most readers, Evans accomplishes the seemingly impossible by merging both the high politics (if one can use that term in describing Hitler’s Germany) with the best in contemporary social history of the Third Reich. This sordid story has never been told so powerfully or from so many different perspectives. The voices of the victims, perpetrators, and bystanders, along with those of the architects of the conquest and genocide, are all heard in chilling detail.

Evans notes that Hitler’s Operation T-4, his “euthanasia action” program, directed against disabled, mentally ill, and incurably sick Germans, laid the

foundation for the more dramatic, Europe-wide extermination programs. To relieve the sense of despair that permeates this book, one searches for heroes, but they are few in number. The sporadic camp and ghetto uprisings were clearly heroic, as was the resistance by such tiny groups as the “White Rose” movement. Although the Roman Catholic bishop Clemens von Galen led the effort to halt the T-4 program, Evans notes that the bishop was silent when it came to the regime’s treatment of Jews and Gypsies. Hitler learned a valuable lesson from the T-4 episode: limit the paper trail and speak in euphemisms when dealing with state-sponsored extermination programs. There was, of course, resistance to Hitler among some members of the officer corps, men whose sense of honor led them to recoil from the atrocities they witnessed in the war in the East. Another group, composed of theologians, lawyers, and some socialist politicians, known to the Gestapo as the Kreisauer Kreis (Kreisau Circle), failed to merge with the military resisters, thus further diminishing the already long odds that Hitler could be deposed.

Unfortunately, more often than not, ordinary Germans reveled in Hitler’s early victories and seemed to endorse, or at least tolerate, Hitler’s annihilation policies. The notion that ordinary Germans were unaware of the atrocities committed in their name is laughable. For instance, in the fall of 1939 German officers and enlisted men wrote home of the incredible “dirt” and “filth” they encountered among the “subhuman” Poles; they began to exterminate parts of the population within days of the

invasion. The swiftness with which Germany implemented a scorched-earth policy designed to eliminate all traces of Polish society is truly breathtaking. Evans convincingly argues that the “final solution” was well under way by the time the notorious Wannsee Conference convened in January 1942. Wannsee was merely an attempt to eliminate bureaucratic infighting and reinforce the authority of Hitler’s point man, Reinhard Heydrich, for the Holocaust.

Evans has written the kind of book to which all scholars aspire. It is a volume in which a lifetime of research and writing comes together in a powerful, and at times moving, manner. It is a book that is sure to become a classic.

STEPHEN KNOTT
Naval War College



Adams, John A. *If Mahan Ran the Great Pacific War: An Analysis of World War II Naval Strategy*. Bloomington: Indiana Univ. Press, 2008. 472pp. \$34.95

It is said of Secretary of War Henry Stimson that in World War II he “frequently seemed to retire from the realm of logic into a dim religious world in which Neptune was God, Mahan his prophet, and the United States Navy was the only true Church.” Now we can judge the validity of that comment, thanks to John Adams’s *If Mahan Ran the Great Pacific War*. Adams grades both the U.S. force and its opponent, the Imperial Japanese Navy (another service professing Mahanian orthodoxy), according to their respective adherence to the sacred text. The result is a lively, interesting exercise in

counterfactual history, one that deals both with what occurred and what might have occurred had the high commands of both navies been more true to what one might call “the revealed Word.”

Counterfactual history is suspect to many historians, who feel they have enough problems figuring out what actually happened, let alone considering what could have happened. However, the Strategy and Policy course at the Naval War College thinks differently, seeking a host of alternatives. Adams essentially agrees, possibly because he is a business executive and not a professional historian; he has written this excellent book as an avocation (more power to him). “War is too important to be left to the generals,” said Clemenceau in World War I. History is too important to be left to historians, if they will not write about counterfactual contingencies.

My reservations about this book are slight but do exist. Excuse my sacrilege, but having taught for twenty years at the U.S. Army Staff College, I cannot help thinking that there might be occasions when Mahan’s precepts could be insufficient. Take his well known injunction, “Don’t divide the fleet.”

Admiral William F. Halsey took this to heart when he was in command of the Third Fleet at the largest naval battle in human history—Leyte Gulf, in late October 1944. As all readers of this journal know, Halsey took his entire force with him to chase down a decoy rather than divide it and provide a blocking force of battleships and escort carriers to prevent a Japanese exit from the San Bernardino Strait. Since Mahan, presumably, cannot be wrong, the blame must fall to Halsey, for not realizing

that his fleet was so powerful that he could divide it and still sustain local superiority. However, because Mahan never considered a situation such as this, one must judge him inadequate as a guide in the last year of the great Pacific War.

“No plan survives first major contact with the enemy,” wrote Helmut von Moltke the Elder, chief of the German General Staff in the mid-nineteenth century. If this be true of plans, which are far less abstract than theories, should one expect that Mahan provides adequate direction through all the contingencies that a warrior might face?

MICHAEL PEARLMAN
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(Retired)



Parkinson, Roger. *The Late Victorian Navy: The Pre-dreadnought Era and the Origins of the First World War*. New York: Boydell, 2008. 323pp. \$145

Roger Parkinson's study of the Royal Navy from 1878 to the 1890s provides a useful overview of a period in British naval history that is sometimes seen as a neglected "Dark Age." He takes issue with the standard work of the period, Arthur Marder's first book, *British Naval Policy, 1880–1905: The Anatomy of British Sea-Power* (1940). In this published version of his University of Exeter doctoral thesis completed under Dr. Michael Duffy, Parkinson expands on the insights of Oscar Parkes, Bryan Ranft, Donald M. Schurman, Paul M. Kennedy, N. A. M. Rodger, Jon T. Sumida, and John Beeler with his own detailed research work in parliamentary papers, the Admiralty and Cabinet

Office files at the National Archives, Kew, and the private papers of Lord Salisbury, Britain's prime minister in 1885, 1886–92, 1895–1902, at Hatfield House.

Parkinson's central focus is on the background and the effect of Britain's Naval Defence Act of 1889 in the period that has come to be called—and even dismissed as—the “pre-dreadnought” era. He is reported to be preparing a follow-up work that will focus on the era of HMS *Dreadnought* from 1906 onward. In the volume at hand, Parkinson argues that most historians of the period have accepted too easily Arthur Marder's picture of Britain's relative naval weakness in comparison with other European naval powers. In particular, Parkinson shows that Britain was not by any means a weak naval power and that W. T. Stead's famous articles in the *Pall Mall Gazette* of 1884 were based on a gross exaggeration of the actual state of affairs. The key consideration, he points out, was maintaining a naval force that was equal to that of the next two largest naval powers, France and Russia. The effort to maintain that margin of supremacy in terms of naval expenditures, tonnage, and warship numbers resulted in the Naval Defense Act in 1889. Parkinson maintains this was the spark that ignited the naval race that lasted until the Washington naval arms-limitation treaty of 1922. As a result, Britain's strategic situation changed from one that was a relatively stable balance between Britain facing France and Russia up to the 1880s to one of the late 1890s and early twentieth century that became a “strategic melting pot with not three but eight major naval powers—Britain, France, Russia, America, Germany, Japan, Italy,

and Austria-Hungary.” The instigation of this naval arms race, Parkinson concludes, was the consistent overreaction in Britain that resulted in the 1889 Naval Act due to the influence on naval policy and strategy by the Royal Navy’s “Young Turks” and panic mongers—W. H. Hall, C. C. P. Fitzgerald, and Lord Charles Beresford, abetted by leading writers like the Colomb brothers and the historian John Knox Laughton, all of whom were encouraged by older admirals such as Admiral of the Fleet Sir Thomas Symonds and Sir Geoffrey Phipps-Hornby.

In reaching these conclusions, Parkinson makes a useful contribution to scholarship, and his original research in

British archives clearly sets his work in the context of recent writings by other scholars of British naval history on this period. The weakness of his work lies in his complete reliance on older, and often outdated, secondary works for his chapter sections on competing navies, such as the U.S. Navy, and the presence in his sources of little, if anything, that is not English on the Latin American navies or on those of France, Germany, and Russia. While readers may lament these weaknesses, Parkinson’s book is, nevertheless, an important and stimulating contribution to the history of the late Victorian navy.

JOHN B. HATTENDORF
Naval War College

IN MY VIEW

THE HEART OF AN OFFICER

Sir:

Admiral Stravridis and Captain Hagerott's thoughtful article ("The Heart of an Officer: Joint, Interagency, and International Operations and Navy Career Development," Spring 2009) has identified an educational and training problem faced by the United States Navy that also challenges most, if not all, of the navies with which the USN operates. Achieving the right balance between the demands of operating the Navy itself and of ensuring that the Navy is employed to best effect has puzzled naval leaders for hundreds of years. At the end of the eighteenth century, Admiral Howe told King George III that "in our service [the Royal Navy] the attention is carried so long alone to seamanship that few officers are formed, and that a knowledge of the military is necessary to open the ideas to the directing [of] large fleets" (cited in N. A. M. Rodger, *The Command of the Ocean: A Naval History of Britain, 1649–1815* [London: Allen Lane, 2004]). As the authors of this article implicitly suggest, if naval officers are not in the forefront of Joint and Interagency operations, those activities will not receive the full benefit which naval capabilities can bring to the exploitation of the maritime environment—nor will that environment ever receive the appropriate level of consideration of its potential. Yet naval warfare, naval operations and the "raise, train and sustain" elements of maintaining a navy have never been more complex and never more demanding. If sufficient expert officers are not provided for these absolutely fundamental requirements, then the very purpose of the navy is at question. A navy that cannot go in harm's way—whether that harm be due to natural or human causes—is not a navy.

But how is it all to be fitted in? How can we be sure that a navy is effectively operated and supported while at the same time officers are prepared and provided for appointments outside the sea service, which themselves require many

skills which may not be of direct relevance to the vital day to day business of the navy?

The USN is in some ways in a better situation than other naval services, in others more difficult. It is so much larger than any other navy that it has the ability to sustain specialisation to a much greater degree—and with that an ability to provide worthwhile careers for those who wish to excel in a particular area. But its unrestricted-line concept is not something that the navies of the Commonwealth in particular have ever felt it possible to adopt. They prefer to have specialist engineers with seaman (or warfare) officers who are very much the operators, in terms of seamanship, navigation and maritime warfare. The Commonwealth argument, and there is a lot in it, is that the demands of the profession are so complex that it is too much to expect an officer to master engineering duties, in particular those required for the ship as a platform (such as nuclear power), as well as those of the seaman and warfare officer. It has been remarked that the British system works best for a ship and the American best for a navy—and there is justice in the observation. Even so, the Commonwealth navies are being challenged by the same problems that face the USN as they move into an increasingly Joint environment and necessarily acquire skill sets which may seem to have little relevance to the bridge or combat information center of a warship (or its engine room). Another and wider dimension of challenge for the navies of the west which cannot go unremarked is how to meet the needs of the increasing number of female officers, who may require more flexible career structures in order to balance their family lives with those of their profession. And, with increasing numbers of career couples, similar flexibility will need to be available to their partners.

Some realities may need to be accepted. The first, as the authors suggest, is that a degree of specialisation is necessary from the first. Officers cannot humanly cover all the bases of the naval profession. Something has to be left to others.

However, notwithstanding the caveats put by the authors about the dangers of an ageing profession and the challenges of mixed-gender and partnered careers mentioned above, the second must be, even with specialisation, that the professional formation of all but the most exceptional sea officer may still be somewhat longer than those of the other services. This may only be a matter of a couple of years but, if considered in terms of seagoing service, those years may be vital to the maintenance of the necessary competencies. If there is one consistent lesson from naval history it is that navies whose leaders possess extensive seagoing experience perform better than those without it. Even with the potential benefits of increasing use of simulation and other “immersion” techniques for training, this reality is unlikely to change.

The third is that much more attention needs to be paid to the continuum of naval education and training and the interaction between that continuum and the acquisition of professional experience. Generation Y have a thirst for self-improvement and for gaining qualifications. This needs to be encouraged but it also needs to be guided. Any survey of the external degrees being attempted by many naval officers in their own time would suggest that a significant proportion have been embarked upon with an eye to a career outside the navy, not the needs of the naval service. Navies need to pre-empt such selections with encouragement of study programs that really do meet the service needs as well as those of the individual.

The structure suggested by the authors provides an excellent basis for devising career streams and paths for education but more needs to be done to manage each officer as part of the effort to formalize the intent of career development. Individual guidance should relate not only to the formal qualifications that an officer attempts to gain but, to put it formally, to encouraging an interior intellectual life. Even the demands of long and arduous days at sea, with the accompanying watches, broken sleep and confined quarters, should not prevent officers reflecting not only on what have been termed the “primary” elements of their profession—their duties in the ship—but the “secondary” and “tertiary” as well. The “primary” guidance will always be something to come from a Captain, the Executive Officer and the Heads of Department (as well as the warrant officers and chiefs!), but modern communications and information systems offer the potential for mentoring from ashore in ways that have never before been possible. Retired and serving senior officers, academics and others with expertise in the naval profession need to be enlisted to put such mentoring on a more systematic basis. This aspect of career management is not a matter to be left to the posters.

The fourth reality, and it has application to other countries than the United States, is that a much wider conception of Joint Professional Military Education (JPME) needs to be devised in order to recognize and provide for the technical experts and their careers. There is much more to Jointery than operations and operational planning, and strong arguments need to be developed to support this proposition. The fact is that, as they become more senior, the navy’s technical experts have the potential to contribute across significant parts of modern Defence organisations. Their technical expertise and management skills should not confine them within their own organisation. The British indicated the potential in this approach some years ago when a senior Army officer, with deep technical and project management expertise, was placed in charge of the project for the Type 45 air defence destroyer, now entering service. All the military

services need to think harder about these technical specialists and achieve as much alignment as possible in their professional development.

All in all, as the authors suggest, navies need to look hard at the ways they prepare their people for the challenges of the future—and be seen, not only by their own officers but by governments and other agencies, as doing so. If they do not, they risk becoming marginalised in a world which is not quick to see the importance of the maritime dimension.

JAMES GOLDRICK

Rear Admiral, Royal Australian Navy

REFLECTIONS ON READING

Professor John E. Jackson is the Naval War College's manager for the Navy Professional Reading Program

As the Navy Professional Reading Program (NPRP) manager, I was recently interviewed for a very informative Web log (or “blog”) known as *Navy Reads*. The blog, written by Bill Doughty, provides excellent book reviews and commentary. It can be found at www.navyreads.blogspot.com. Among the questions and answers in the interview are:

Do you have any anecdotes or stories about how the NPRP has helped individuals? Have senior Navy leaders told you the program is helpful?

In 2007, a survey was conducted by the Navy Personnel Research, Studies, and Technology organization. Seventy-five percent of the senior leaders surveyed said that “the NPRP will make the Navy of tomorrow better than the Navy of today.” Aboard USS *Vella Gulf* (CG 72), the CO established a “Heritage and History Leadership Essay” contest where sailors could win cash awards for writing about books from the NPRP. The skipper of USS *Stockdale* (DDG 106) asked for an NPRP library during the ship’s precommissioning workup, since he felt these books would help shape his crew into the cohesive fighting unit it is destined to become. We happily hand-delivered an NPRP library to the ship in Bath, Maine, before it began sea trials.

Who is recommending additional titles as the program evolves? Would you accept recommendations from sailors and Navy civilians?

The program office at the Naval War College receives e-mails and letters nearly every day with book suggestions. Our Advisory Group also exchanges messages about new books, and we get suggestions from faculty members at the Naval War College, Naval Postgraduate School, and the U.S. Naval Academy. Suggestions can be forwarded to us at navyreading@nwc.navy.mil.

What’s on the horizon for the NPRP?

We are experimenting with e-book readers, such as Kindle, to see if this technology is a good way to get our books in the hands of our readers. We have

purchased Playaway-brand audiobooks for patients in Navy hospitals who cannot read or hold a book but still want to participate in the NPRP. We also continue to provide downloadable e-books and audiobooks from Navy Knowledge Online (NKO). We are hoping to sponsor author book signings with our partners at the Navy Exchanges, and we continue to make our website, www.navyreading.navy.mil, as interesting and functional as possible.

You've said you encourage people to renew their fighting spirit through the power of professional reading. Why is reading important for our Navy and our nation?

Reading is important because it allows people to benefit from the lessons learned by others, going back literally thousands of years. An old sage once said, "You can never live long enough to make all the mistakes yourself." Good books entertain, illustrate, and educate. They open a door to the past, they explain what is happening today, and they project what may happen in the future. You need only to read about the actions of the men and women in Navy blue who went before you to understand that we are all part of an organization much bigger than ourselves and with a tremendous legacy on which we can build. Thomas Jefferson once wrote, "I cannot live without books." Every avid reader feels the same way.

What brand-new titles would you recommend as good Navy reads?

Six Frigates, by Ian Toll (fairly new, reviewed in the Winter 2008 issue of this journal)—about the founding of the U.S. Navy; *Leave No Man Behind*, by George Galdorisi and Thomas Phillips, about combat search and rescue; *Shattered Sword*, by Jonathan Parshall and Anthony Tully, on the battle of Midway; and *Lincoln and His Admirals*, by Craig Symonds, on President Lincoln's relationship with his naval commanders during the Civil War. We also recommend *Wired for War*, by P. W. Singer (the robotics revolution, reviewed in this issue), and *Three Cups of Tea*, by Greg Mortensen (promoting peace through education).

NPRP books: You can read them in hard-copy—you can read them as e-books—you can listen to them as audiobooks. The Navy Professional Reading Program is accessible to everyone who wants to participate—and as the program's motto says, it will "Accelerate your Mind."

